

The Mediterranean Diet as an Example of Environmental Sustainable Food Model

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Abstract

The Mediterranean diet not only makes reference to some characteristic eating habits, it is also a cultural model that involves the way foods are selected, produced, processed and distributed. The Mediterranean dietary pattern is presented not only as a cultural model but also as a healthy and environmentally friendly model.

UNESCO recognition of the Mediterranean diet as an Intangible Cultural Heritage of Humanity represents a strong visibility and acceptance of the Mediterranean diet worldwide. This along with better and more scientific evidence relating its benefits and effectiveness on longevity, quality of life and disease prevention, has taken this dietary pattern to an historical moment without precedent. This is a positive situation that could allow the empowering of the Mediterranean diet around the world, thereby enhancing in global health indicators and in decreasing of environmental impact by production and transportation of food resources.

To this end, the Mediterranean diet should be seen for what it is: an extremely and incomparable healthy, affordable and environmentally sustainable food model, as well as an ancient cultural heritage that confers identity and belonging. From the heart to the earth through the road of culture, the Mediterranean diet is a cultural heritage that looks to the future.

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Abbreviations: CHD: Coronary Heart Disease; CVD : Cardiovascular Disease; DP: Dietary Pattern; GHG: Greenhouse Gas; GI: Glycemic Index; GL: Glycemic Load; MD: Mediterranean Diet; MDP: Mediterranean Diet Pattern; MUFA: Monounsaturated Fatty Acids; SCP: Spanish Current dietary pattern; SES: Lowest Socioeconomic Status; WDP: Western Dietary Pattern

Introduction

Research has consistently shown that certain dietary patterns, such as the Mediterranean diet (MD), play a role in chronic disease prevention (Serra-Majem, et al., 2006; Sofi, et al., 2010; Trichopoulou, et al., 2014). Moreover, the MD has been linked to higher nutrient adequacy in both observational and intervention studies (Serra-Majem, et al., 2009; Castro-Quezada, et al., 2014). Thus, the MD, emerges as a dietary pattern that could address health and environmental issues, as a plant-centered dietary pattern that admits moderate to low amounts of animal foods (Duchin, 2005). The MD not only makes reference to some characteristic eat-

ing habits, it is also a cultural model that involves the way foods are selected, produced, processed and distributed (Serra-Majem, 2010, Serra-Majem, et al., 2012). This has been pointed out particularly after the recognition by UNESCO, of the Mediterranean diet as an Intangible Cultural Heritage of Humanity (UNESCO, 2010).

The widespread dissemination of Western-type culture, along with the globalization of food production and consumption, which is related to the homogenization of food behavior in the modern era, have brought about that current diets in Mediterranean countries are departing from the traditional MD insofar as the quantities and proportions of the food groups are concerned (Da Silva, et al., 2009).

The aim of the present document is to analyze the evolution of Mediterranean diet studies, from its origins circa 1960 (Figure 1), and to emphasize the different focus that have come to light over the last five or six decades: from the heart (public health approach) to the earth (environmental approach).

- ▶ 1950. Ancel and Margaret Keys. *Way of living: food, health and culture.*
- ▶ 1970. *A medical diet to prevent diseases.*
- ▶ 1990. *A medical diet to treat diseases. Assessing the Mediterranean diet. Pyramids. Increasing and improving the evidence.*
- ▶ 2000–10. *An anthropological view: culture. UNESCO.*
- ▶ 2005–20. *An economical view. Diet for all. Affordability.*
- ▶ 2010–20. *An environmental view: sustainability.*
- ▶ 2015. *The Road Map: Worldwide coordination: IFMED.*

Figure 1: Steps in the Pathway of addressing the Mediterranean diet.

The Beginnings: Cardiovascular health as the main target

Early research on Mediterranean diet, when Ancel Keys initiated his investigations, the principal disease outcome analyzed was Cardiovascular Disease (CVD), in particular Coronary Heart Disease (CHD) (Keys et al., 1986). Most of the investigation carried out was aimed at CVD risk factors and only at the end of the last century were large observational cohorts made towards enhanced the scientific evidence concerning the MD and CVD and other disease occurrence. The PREDIMED (PREvención con DIeta MEDiterránea) study, others clinical or community trials and some important prospective epidemiological studies (Serra-Majem, et al., 2006; Martínez-González, et al., 2009; Estruch, et al., 2013, Salas-Salvadó, et al., 2014; Martínez-González, et al., 2015), have exponentially been improving the level and the quality of the scientific evidence around the MD. From the initial systematic review of the evidence from MD interventions performed a few years ago, the Mediterranean diet indicated favorable effects on lipoprotein levels, endothelium vasodilatation, insulin resistance, metabolic syndrome, antioxidant capacity, myocardial and cardiovascular mortality, and cancer incidence in obese patients and in those with previous myocardial infarction (Serra-Majem et al., 2006).

The Mediterranean diet, apart from its traditionally historically endowed benefits (cardiovascular diseases, diabetes, cancer), has other numerous health benefits that are currently fields of research as seen in studies evaluating immunity, allergic diseases, mental disorders such as depression or even quality of

life .

The MD is the heritage of millennia of exchanges in the Mediterranean basin that have determined and distinguished the eating habits of the countries in this area. Unfortunately, a myriad of factors related to the Western economy including tourism, urbanization and increased technology as well as the globalization of production and consumption, are currently leading at these countries a steady but rapid transformation in their eating habits. This food culture now faces three serious threats:

- (1) The American fast food culture based on meat, refined grains, French fries potatoes, icecreams, candies, and beverages high in sugar;
- (2) The economic crisis which has a higher impact on the most disadvantaged populations and affects key MD food groups such as fruits, vegetables, virgin olive oil, nuts, and fish, thus reducing their consumption; inversely, the ingestion of refined grains, potatoes, and sugars has increased; and
- (3) The promotion of high-protein diets, also prescribed by doctors and specialists, as a tool for weight loss or maintenance, with a major impact on health.

The erosion that these threats can cause, especially the economic factor, must be countered with actions based on nutrition education, and the commitment that neither cost nor unfounded food choices cannot and should not be a barrier to the availability of basic foods of the MD: olive oil, fruits, vegetables, grains, dairy, nuts, or fish. Governments, thus need to commit themselves to take appropriate actions that preserve this traditional and cultural knowledge base and lead to a diversity of sustainable foods and diets, and not only taking into account the short and long term health benefits that they could provide.

The Cultural approach: UNESCO recognition

The Mediterranean diet is a cultural, historical, social, territorial and environmental heritage that has been transmitted from generation to generation for centuries, and is intimately linked to the life styles of the Mediterranean peoples throughout their history. A legacy passed on within a temporal and spatial constant flow, a living heritage encompassing unique and outstanding cultural spaces and promoting respect for cultural diversity and human creativity. It is an expression of sociability and communication between villages and individuals, a way to reinforce individuals' identities in their places of origin, an integrative element of communities with nature and history, a defense mechanism of agriculture and sustainable rural development and the landscape and environment of our territory (Serra-Majem and Medina, 2015).

Since 16 November 2010, the Mediterranean diet has been inscribed into UNESCO's Representative List of Intangible Cultural Heritage of Humanity (UNESCO, 2010). The objective of this initiative was to safeguard the immense legacy representing the cultural value of the Mediterranean diet, as well as to share and disseminate its values and benefits internationally.

The Ecological concern

The environmental consequences of food systems have begun to carve their place on public health agendas. Foods are produced, processed, distributed and consumed, and these actions have consequences for both human health and the environment (Gussow and Clancy, 1986). Furthermore, food production is also inevitably a conductor of environmental pressures,

in particular regarding the climate change, water use and toxic emissions. Greenhouse gas (GHG) emissions, such as CO₂, CH₄ and N₂O, are liable for global warming. Agriculture is one of the principal contributors to the emissions of the last two gases previously mentioned while other parts of the food system promote CO₂ emissions, through the use of fossil fuels in processing, transportation, retailing, storage and preparation. Food items vary substantially in their environmental footprints, which can be assessed, among many other descriptors, in terms of energy consumption, agriculture land use, water consumption or GHG emissions (Carlsson-Kanyama and González, 2009). Animal-based foods are by far the most land- and energy-intensive compared with foods of plant origin (Baroni et al., 2007). Thus, dietary patterns can differ substantially in their resource consumption and the subsequent impact on the environment as well as on the health of a given community (Carlsson-Kanyama and González, 2009).

Regarding the environmental impact of the different food groups, most of the literature available converges in their global statements, despite originating from different settings and types of analysis. Plant-based foods were the group that least provided to the selected environmental footprint and, as expected, in the traditional MD meat and dairy showed lower figures for water consumption and to a lesser extent in energy consumption in relation with the current Mediterranean and Western patterns. Plant foods based on vegetables, cereals and legumes are strongly the food group with the lowest GHG emissions even where processing and substantial transportation is involved (Carlsson-Kanyama and González, 2009). Legumes are clearly stated as alternatives to animal protein foods due to their low environmental impact and long durability.

The most important dietary features in terms of environmental cost are those that occur between animal-based versus plant-based diets, with a relevant influence of the different ways foods are grown, processed and transported. The largest environmental impact of food production from the farm level to consumers is generally related with primary production. With regard to energy consumption, variations in greenhouse production versus open-air cultivation of certain crops, and canned or frozen produce versus fresh produce are vitally important (Reijnders and Ssoret, 2003). Besides the energy involved in agricultural production, the amount of energy used in household food storage, preparation and waste is not negligible (Carlsson-Kanyama and González, 2009).

So far, food policy and dietary guidelines have had a classical approach focusing on nutrients and their health benefits. They need to develop and move, expanding its approach, taking into consideration the environmental impact and sustainability. Consumers are becoming more and more concerned about the environment care and, even more so, about their own health and food choices, while cultural culinary traditions are not easy to modify. Some studies state that even radical changes in food consumption patterns would cause quite small environmental benefits (Wallén et al., 2004; Tukker et al., 2011). A considerably reduction of the environmental footprints due to a change from the current non-MD in most European Mediterranean countries towards a MD type would probably not only demand substantial changes in consumers' food choices but also demand essential reforms in agrofood-industry practices, public catering supply and agricultural and trade policies (Wallén et al.,

2004; Duchin, 2005). As for the major producers and exporters of typical Mediterranean foodstuffs, it would make sense to keep a MD agricultural production model in Mediterranean countries.

Sáez-Almendros, et al. (2013) studied recently the sustainability of the MD pattern (MDP) in the context of the Spanish population and compared in terms of their environmental footprints (Green house gases –GHG- emissions, land use, water consumption and energy resources consumed), the current Spanish diet with both the MDP and a typical Western dietary pattern (WDP). Research such as those that assess food related environmental impacts of mean food dietary patterns, generally determine that a change on the way to less animal-based and more plant-based diets would have both a beneficial effect on climate and on the environment overall. It was found that the MDP involves lower demands on soil, compared to both the Spanish current dietary pattern (SCP) and to WDP, and also on water and energy resources (even though estimates were conservative). Indeed, it was observed that a change in the direction of a MDP would result in a reduction of the Spanish environmental footprint in any of the considered indicators pressures from 33 to 72%. On the contrary, a gradual change on the WDP would denote an intensification in the footprints (12-72%). These results emphasize the sustainable character of the MDP in an increasingly globalized world.

Although legumes are commonly recommended as environmentally friendly alternatives, some vegetable origin foods contribute significantly, together with dairy products, in the case of the MDP and SCP, to either water consumption (vegetable oils particularly, and to some extent nuts) or land use (cereals and vegetable oils) in their production (Sáez-Almendros, et al., 2013). In both the SCP and the WDP, vegetable oils also contributed to an increase of to water and energy consumption footprints. Moreover, animal-based foods were found to cause the highest environmental effect in all dietary patterns. Like in other research conducted among the Spanish population, meat and dairy were the foodstuffs that most increased environmental footprints, even though at a much lower influence than the WDP. As far as GHG emissions and land use were concerned, beyond doubt, meat resulted as the food item that contributed to a greater extent, presenting a significant difference compared to other foods, both in the WDP and SCP (Sáez-Almendros, et al., 2013). It was observed that a reduction in meat consumption decreased GHG emissions, and land use, subsequently increasing the availability of land for other uses (Stehfest et al., 2009). Although there is high production variability, which may be as much of 80% of global agriculture across countries, land use is linked to livestock production and accounts for more than half of the GHG emissions resultant from agriculture. In the meantime, dairy products, one of the principal sources of animal protein in the MDP, providing a great extent in terms of energy consumption in the three dietary patterns. Dairy products were the food groups, in the MDP, presented the maximum footprint in all four analyzed footprints since in the MDP, meat had a lower weight compared to the other patterns both in frequency and amount. With respect to GHG emissions, fish also indicated a noteworthy environmental contribution in all the dietary patterns. According to these results, embrace the MDP in Spain would significantly reduce overall water consumption, in spite of a potential increase in water consumption from vegetable and fruit groups. Water consumption of certain food groups such as vegetable oils

and fats or meat products would still be lower than the WDP.

As an overall conclusion, a change from the current Spanish pattern just before the Mediterranean dietary pattern would be beneficial from both a health and environmental perspective. The Mediterranean dietary pattern shows lower footprints than the current Spanish pattern, and to a much larger extent than the Western dietary pattern. The Mediterranean dietary pattern demonstrates a lower environmental impact through the consumption of more plant-derived products and less animal foodstuffs (Sáez-Almendros et al., 2013). The Mediterranean dietary pattern is presented not only as a cultural model but also as a healthy and environmentally friendly model (Serra-Majem et al., 2011; Germani et al., 2014). Its adherence in Spain would make a significant contribution to greater sustainability of food production and consumption, in addition to the well-known benefits for public health.

Final consideration

Governments need to commit themselves to undertake appropriate actions, so that our traditional and cultural knowledge are preserved and build bridges to the diversity of foods and diets, without considering only to the health benefits that could be supplied in the short and long term (Piscopo, 2009).

UNESCO recognition of the Mediterranean diet as an Intangible Cultural Heritage of Humanity represents a strong visibility and acceptance of the Mediterranean diet worldwide. This along with better and more scientific evidence relating its benefits and effectiveness on longevity, quality of life and disease prevention, has taken this dietary pattern to an historical moment without precedent. This is a positive situation that could allow the empowering of the Mediterranean diet around the world, thereby enhancing in global health indicators and in decreasing of environmental impact by production and transportation of food resources (Figure 2). To this end, the Mediterranean diet should be seen for what it is: an extremely healthy and environmentally sustainable food model, as well as an ancient cultural heritage that confers identity and belonging (Bach-Faig et al., 2011). With the leadership of the new international organization –The International Foundation of the Mediterranean Diet (IF-MeD) www.ifmed.org– the future is over. IFMeD aims to raise public awareness of healthy and sustainable nutrition, making it a central issue, and to promote the international cooperation agreements with actors both public and private stakeholders to support and pursue the values and benefits of the Mediterranean diet.

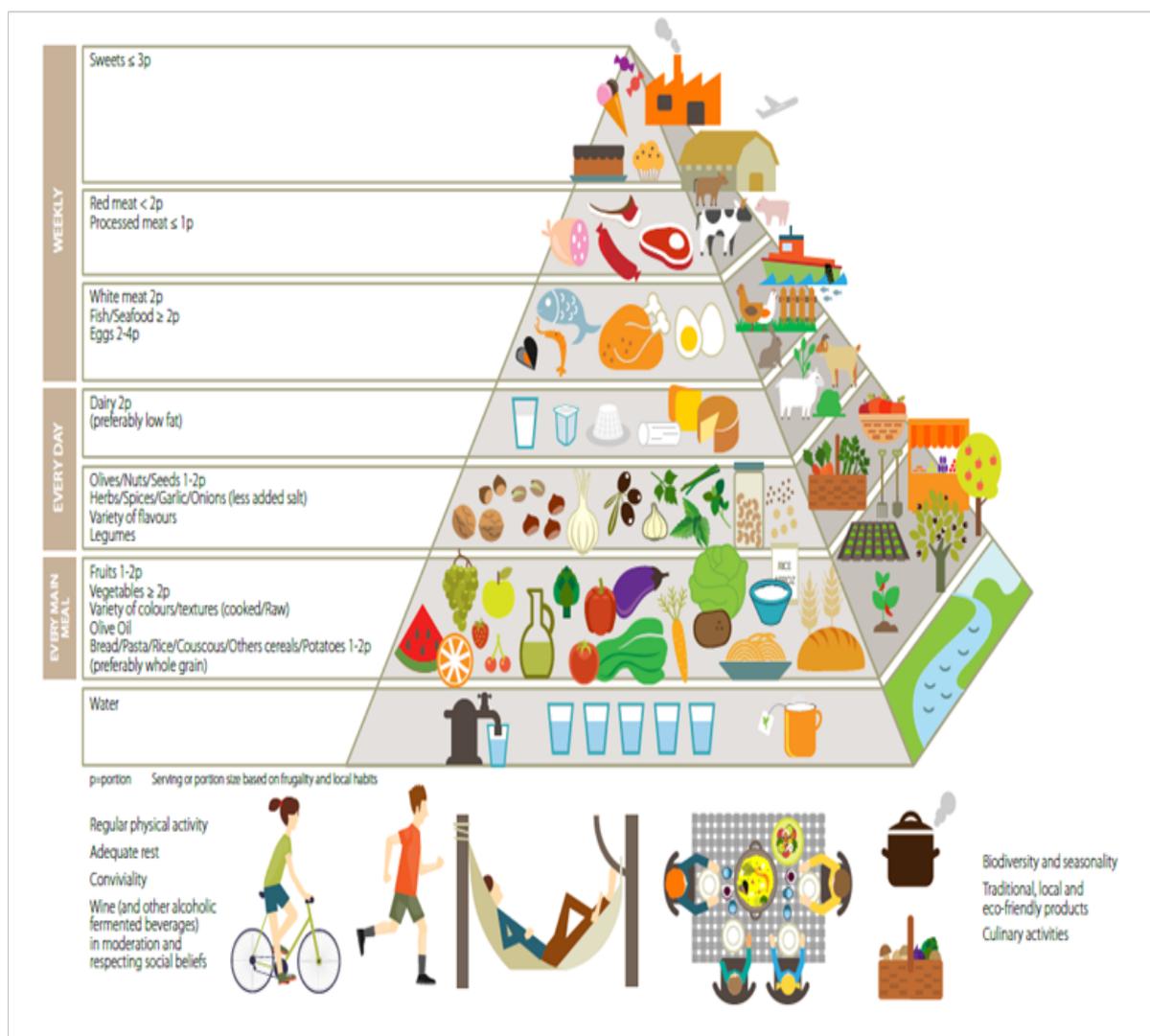


Figure 2: New pyramid for sustainable Mediterranean diet.

Source: IFMED Consensus document. The First World Conference on the Revitalization of the Mediterranean Diet, 6-8 July 2016, Milan.

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