

Chapter 1

Updating the Benefits of the Mediterranean Diet: From the Heart to the Earth

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Key Points

- Research has consistently shown that certain dietary patterns, such as the Mediterranean diet (MD), play a role in chronic disease prevention. The MD should be understood not only as a set of foods but also as a cultural model that involves the way foods are selected, produced, processed, and distributed.
- Mediterranean diet interventions showed favorable effects on lipoprotein levels, endothelium vasodilatation, insulin resistance, metabolic syndrome, antioxidant capacity, and myocardial and cardiovascular mortality, and CHD incidence in patients with previous myocardial infarction. Current research is investigating the health impact of the Mediterranean diet against immune and allergic diseases, mental disorders and depression, and quality of life.
- 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 lifestyles of the Mediterranean peoples throughout their history. Compared with current Mediterranean and Western patterns, the traditional MD reduces the water, and to a lower extent, energy resources necessary for the production of meat and dairy products.
- There is a need to reinforce the promotion of the MD in low-income populations and to facilitate the access to key Mediterranean foods to high-risk families, in particular during economic constraints. 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.

Keywords Mediterranean diet • Sustainability • Health benefits • Culture • UNESCO • Environment

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Introduction

Research has consistently shown that certain dietary patterns, such as the Mediterranean diet (MD), play a role in chronic disease prevention [1–3]. Moreover, the MD has been linked to higher nutrient adequacy in both observational and intervention studies [4, 5]. Thus, the MD, as a plant-centered dietary pattern that does not exclude but admits moderate to low amounts of animal foods, seems to emerge as a dietary pattern that could address both health and environmental concerns [6]. The MD should be understood not only as a set of foods but also as a cultural model that involves the way foods are selected, produced, processed, and distributed [7]. This has been upheld by the fact that the MD was acknowledged by UNESCO as an Intangible Cultural Heritage of Humanity [8]. Unfortunately, current diets in Mediterranean countries are departing from the traditional MD insofar as the quantities and proportions of the food groups are concerned. This is due to 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 [9]. The aim of the present chapter is to analyze the road map for the MD from its origins circa 1960, and to emphasize the different approaches that have come to light over the last five or six decades: from the heart (public health focus) to the earth (environmental focus).

The Beginnings: Heart Health as the Main Objective

Since its origins, when Ancel Keys initiated his studies on the MD, the principal disease outcome analyzed was cardiovascular disease (CVD) and particularly coronary heart disease (CHD) [10] (Fig. 1.1). Most of the research done was oriented to CVD risk factors and only at the end of the last century were large observational cohorts conducted to increase the evidence regarding the MD and CVD and other disease occurrence. Relevant prospective epidemiological studies and some clinical or community trials, such as the PREDIMED study [2, 11, 12], have exponentially been increasing the level and the quality of the evidence around the MD in the last decades. From the first systematic review of the evidence from MD interventions conducted a few years ago, the MD showed favorable effects on lipoprotein levels, endothelium vasodilatation, insulin resistance, metabolic syndrome, antioxidant capacity, and myocardial and cardiovascular mortality, and CHD incidence in patients with previous myocardial infarction [2]. From the second published systematic review, a meta-analysis of observational cohort studies by Sofi et al. in 2008, revisited in 2010 and 2013 [13] on the evidence of the relationship between the MD and health status, yielded interesting data: a two point increase in the adherence score (or 20 % increase in MD adherence) was significantly associated with a 9 % reduction in overall mortality; 10 % reduction in CVD mortality; 6 % reduction in neoplasm incidence or mortality; and 13 % reduction in the incidence of Parkinson's disease and Alzheimer's disease in the general population.

The epidemiological evidence regarding the relationship between the MD and overweight/obesity is inconsistent. However it reveals that the MD is not related to any increased risk of overweight/obesity and actually points towards a possible role of the MD in preventing overweight/obesity, with physiological mechanisms possibly explaining this protective effect [14]. Furthermore, the PREDIMED trial results pointed out that the MD, especially rich in extra-virgin olive oil, is associated with higher levels of plasma antioxidant capacity. The plasma total antioxidant capacity was related to a reduction in body weight after 3 years of intervention in a high cardiovascular risk population with a Mediterranean-style diet rich in extra-virgin olive oil. Moreover, further PREDIMED results suggested that there was no evidence to sustain the concern that Mediterranean

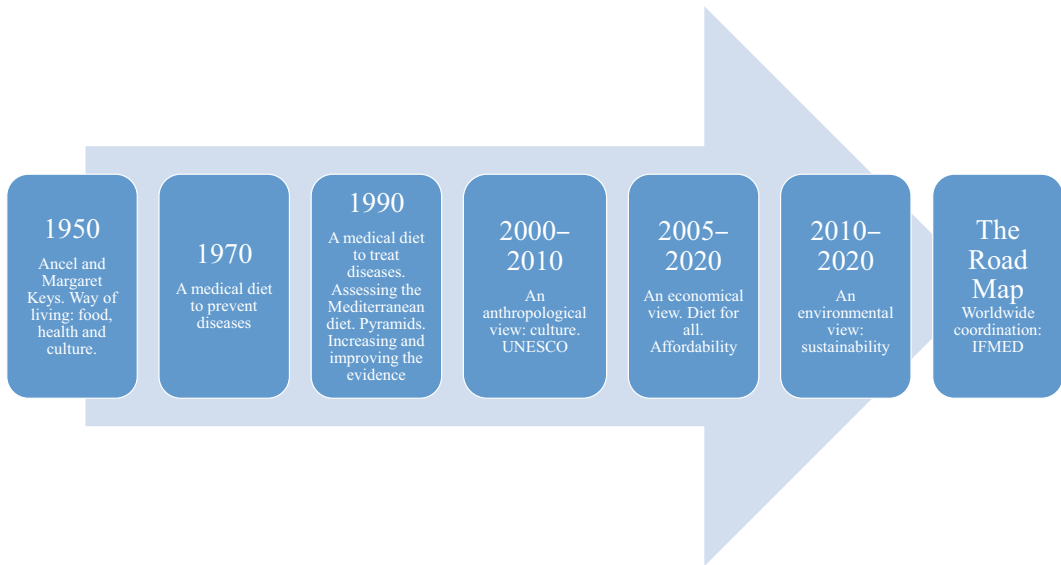


Fig. 1.1 Key steps in the pathway addressing the Mediterranean diet

food items rich in fats of vegetable origin (olive oil or tree nuts) may cause weight gain or be responsible for increased obesity risk, provided that energy intake does not exceed energy expenditure. The MD has also been associated in the PREDIMED study to a lower incidence of type II diabetes, in subjects with higher intake of nuts and extra-virgin olive oil [15]. It should be noted that the role of the MD in the primary prevention of CVD and other cardiovascular conditions has been confirmed by other studies [12, 16].

Greater adherence to the MD has been inversely associated with the glycemic index (GI) and the glycemic load (GL). Nevertheless, further studies are needed to analyze the quality of carbohydrate composition of the MD according to glycemic response so as to increase the scientific evidence underlying the recommendations of the MD as a model of prevention for CVD and diabetes [17]. The relevance of studying the GI and GL mainly relies on the relationship of these indexes with chronic diseases, which have been assessed in several studies. For instance, it has been demonstrated that diets with lower values of GI and GL reduce the risk for diabetes, and its protective action may be similar to whole grain and high fiber intakes. High dietary GI and GL were significantly associated with an increased risk of coronary heart disease events in women. A recent meta-analysis showed that there was a significant association between GI and GL and the risk of colorectal and endometrial cancer, while the relationship with other types of cancer was inconsistent. The mechanisms through which low-GI diets may decrease chronic disease risk are still unknown. After the consumption of a high GI food, a dramatic increase in blood glucose occurs. This is followed by a large insulin response and inhibition of glucagon release. In contrast, low-GI foods produce an attenuated glucose response, due to the prolonged and continued absorption of nutrients from the gastrointestinal tract. Therefore, the resulting hormone responses and their effects are more homeostatic, reducing postprandial hyperglycemia and hyperinsulinemia, and attenuating late postprandial rebounds in circulating non-esterified fatty acids (NEFA). These effects of a low-GI diet could attenuate oxidative stress, which is associated with inflammation and other risk factors for chronic diseases. Although a low GI and GL have been associated with a reduced risk of total mortality and CHD in the PREDIMED study [18, 19], there is still insufficient evidence to warrant the inclusion of dietary recommendations addressing GI and GL for the general population.

Besides the traditionally recognized health benefits against chronic diseases (e.g., CVD, cancer), the MD has other numerous health benefits that are subject of intense research. These include improved immunity and quality of life and prevention against allergic diseases and mental disorders such as depression. Finding a dietary pattern that fulfills the nutritional requirements of a population is a priority to make nutritional recommendations. Nutrient adequacy is defined as the sufficient intake of essential nutrients needed to fulfill nutritional requirements for optimal health. Depending on the criterion of adequacy that is defined, the requirement for a given nutrient may be at a lower or a higher intake level. The criteria that are generally used to define intake adequacy are the prevention of deficiency diseases, the prevention of chronic diseases, the reduction of risk for nutrition-related diseases, subclinical nutritional health conditions identified by specific biochemical or functional measures, and requirements to maintain physiological balance. Nutritional adequacy emerges from the comparison between the nutrient requirement and the intake of a certain individual or population. As neither the real intake nor the requirement for one individual is known, the assessment of nutrient intake adequacy of an individual or population is based on the probability of adequacy [20]. The MD used to be sufficient in calories and rich in vitamins and minerals derived from vegetables, fruits, whole-meal cereals, nuts, virgin olive oil, and fish, which made the risk of deficient micronutrient intakes quite infrequent. This explains why inadequate intakes of the vitamin B group (B1, B2, niacin, B6, folates or B12) were rare in the Mediterranean basin, and why intakes of antioxidant vitamins (vitamins E and C) and carotenes were also high [4, 5]. However, people from Mediterranean countries are changing the traditional MD and include low nutrient-dense foods (such as sweets, bakery products, salted snacks, and sugared soft drinks) or vary their food processing methods (such as refinement of flour) towards a less healthy diet. These changes may have contributed to an increased risk of deficient intakes for certain vitamins, particularly folates, vitamins A and D, as well as inadequate intakes for the rest of the vitamins, especially amongst certain population groups or communities. The MD has been associated with nutritional adequacy in adult population and children. Greater adherence to a MD pattern (MDP) was associated with a higher prevalence of individuals showing adequate intakes of micronutrients [4]. The MDP had similarities with the healthiest patterns defined in non-Mediterranean countries: a positive correlation with intakes of fruits, green leafy vegetables, poultry and fish, and certain lifestyle habits such as nonsmoking and being more physically active. However, when the association of the dietary patterns with their nutrient intake profiles was analyzed, differences arose, especially in relation to fat intake. Prudent and Healthy Diet patterns (HDP) had lower intakes of total and saturated fat, and some studies found even lower intakes of monounsaturated fatty acids (MUFA) [21]. Traditionally, HDP have shown higher percentages of energy coming from proteins and carbohydrate and lower percentages of energy coming from fat when comparing the highest quintile to the lowest. This has always been an argument against the widespread use of olive oil for certain nutritionists who do not support the higher fat in MD and who are in favor of cutting down the total fat intake to less than 20–25 % [22].

Nutritional adequacy may be used to determine the risk of deficiency of the nutrient assessed, in terms of low intakes or high intakes (for instance, the adverse effects of high levels of sodium intake may be applicable to reducing the risk of certain chronic diseases or conditions such as hypertension). However, the complexity of the relationships between dietary intake and the pathology cannot be attributed to a single nutrient but rather to multiple nutrients and associations of foods. Thus, the correct exposure has to be measured to understand such a relationship, and not only nutrients but also foods, and the interaction between them, are of concern for this kind of evaluation. Food pattern analysis, such as the MDP, is then a key issue when investigating the linkages between nutrition and disease. In the last decade there has been growing interest in assessing the relationships between diet and disease through the study of whole dietary pattern (DP) instead of focusing on single nutrients or foods. Besides a priori defined DP, which are based on previous hypotheses (e.g., the MD score), another approach consists of collecting food data and then identifying at a later period the DP followed by the study subjects. This is an a posteriori

approach (post hoc) to obtain DP empirically derived from available data through statistical procedures such as principal component analysis. Though several studies have assessed the relationship between a posteriori DP and different health outcomes, to our knowledge little evidence has been collected on post hoc DP and all-cause mortality in Southern European populations. Using factor analysis, Martinez-Gonzalez et al. [23] investigated the association between baseline adherence to an a posteriori defined major DP in a cohort of older Spanish subjects at high cardiovascular risk recruited into the PREDIMED study, a nutritional intervention trial comparing two MDP (enriched with extra-virgin olive oil or nuts) with a low-fat diet for cardiovascular outcomes [23]. Two DPs were uncovered. The baseline Western dietary pattern (WDP) consisted of a higher consumption of processed meats, red meat, refined grains, alcohol, whole-fat dairy products, sauces, eggs, processed meals, commercial bakery, chocolates, and potatoes. In contrast, the baseline MDP was characterized by a higher intake of extra-virgin olive oil, vegetables, fish and seafood, fruits, whole-wheat bread, and nuts. The results showed that a closer baseline adherence to the MDP was associated with a significant 31 % reduction in all-cause mortality, while a higher adherence to the WDP was associated with higher mortality in energy-adjusted analyses. In addition it was observed that within the three intervention groups the protective effect of the MDP or the detrimental effect of the WDP on mortality tended to persist. However the associations were more apparent in the control group. The highest relative risk of mortality was found for participants in the top quartile of the WDP who were allocated to the control (low-fat diet) group.

The MD is the heritage of millennia of exchanges in the Mediterranean basin that have defined and characterized the eating habits of the countries in this region. Unfortunately, it is currently undergoing a steady but rapid transformation as a result of a myriad of factors related to the Western economy including tourism, urbanization, and increased technology as well as the globalization of production and consumption. The Western food culture promotes three elements that may increase health risks: (1) The Western fast food culture based on meat, refined grains, potatoes, ice cream, candies, and beverages high in sugar; (2) The recent (and possibly future) economic crisis which has a higher impact on the most disadvantaged populations and reduces consumption of MD food groups such as fruits, vegetables, virgin olive oil, nuts, and local fish; inversely the consumption of refined grains, potatoes, and sugars is 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.

These trends should be countered with actions based on nutrition education, and the commitment that neither cost nor unfounded food choices should be a barrier to the availability of basic foods of the MD, that is olive oil, fruits, vegetables, grains, dairy, nuts, and fish. Governments and nutrition organizations should adopt appropriate actions to preserve this traditional and cultural knowledge base and lead to a diversity of sustainable foods and diets, in addition to fostering short- and-long term health benefits associated with the MD and lifestyle.

The Cultural Approach: UNESCO Recognition

The MD 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 lifestyles 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's 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 its territory [24].

Since 16 November 2010, the MD has been inscribed into UNESCO's Representative List of Intangible Cultural Heritage of Humanity [8]. The objective of this initiative was to safeguard the immense legacy representing the cultural value of the MD, as well as to share and disseminate its values and benefits internationally. This process was conceived and had been germinating in civil society from the outset and had the privilege of counting on the involvement of national, regional, and local institutions, receiving the unconditional support of the scientific community. It continues to enjoy the support and commitment of all the organizations that for many years had worked in favor of this Mediterranean heritage. Besides, after publicly expressing the wish to present the MD nomination to UNESCO, there was a genuine explosion of enthusiasm and support from institutions and all types of associations, thus consolidating the transversal nature of the project. This elation came to demonstrate that a close bond and genuine identification persisted between the Mediterranean society and its cultural and food heritage.

The Ecological Concern

The environmental consequences of food systems are a main focus of current public debate. How foods are produced, processed, distributed, and consumed have consequences for both human health and the environment [25]. Furthermore, food production is also inevitably a driver of environmental pressures, particularly in relation to climate change, water use, and toxic emissions. Greenhouse gas (GHG) emissions, such as CO₂, CH₄, and N₂O, are responsible for global warming. Agriculture is one of the main contributors to the emissions of the last two gases mentioned while other parts of the food system contribute to CO₂ emissions due to the use of fossil fuels in processing, transportation, retailing, storage, and preparation. Food items differ substantially in their environmental footprints, which can be measured, among many other descriptors, in terms of energy consumption, agriculture land use, water consumption, and GHG emissions [26]. Animal-based foods are by far the most land- and energy-intensive compared with foods of plant origin [27]. Thus, dietary patterns can substantially impact natural resource usage and the environment as well as the health of a given population [26].

In general, there has been substantial literature convergence about the impact of the different food groups on environmental sustainability. Plant-based foods are among those that appear to contribute the least to the environmental footprint. As a result, the traditional MD has a lower impact on water consumption and to a lesser extent energy consumption compared with the current Mediterranean and Western patterns that rely more on meat and dairy products. Plant foods based on vegetables, cereals, and legumes are noteworthy as the food group with the lowest GHG emissions even where processing and substantial transportation is involved [26]. Legumes are clearly an alternative to animal protein foods due to their low environmental impact and long durability [26].

The most relevant dietary distinctions in terms of environmental cost are those that occur between animal-based versus plant-based diets, with an important influence of the various ways foods are grown, processed, and transported. The largest environmental impact of food production from the farm level to consumers is generally associated with primary production. In terms of energy consumption, differences in greenhouse production versus open-air cultivation of certain crops, and canned or frozen produce versus fresh produce are substantial [28]. Besides the energy involved in agricultural production, the amount of energy used in household food storage, preparation, and waste is not negligible [26].

Food policy and dietary guidelines need to develop and move on from the classical approach that only focuses on nutrients and health to one that takes into consideration environmental impact and sustainability. Consumers are becoming more and more concerned about the environment and, even

more so, about their personal health and food choices, while cultural culinary traditions are not easy to modify. Some studies suggest that even radical changes in food consumption patterns would provoke quite small environmental benefits [29, 30]. Significantly reducing environmental footprints through a shift from the current non-MD in most European Mediterranean countries towards a MD type would probably not only require substantial changes in consumers' food choices but also imply significant modifications in agrofood-industry practices, public catering supply, and agricultural and trade policies [6, 30]. As for the major producers and exporters of typical Mediterranean products, it would make sense to sustain a MD agricultural production model in Mediterranean countries.

Recently, Sáez-Almendros et al. [31] analyzed the sustainability of the MDP in the context of the Spanish population, whilst also comparing, in terms of their environmental footprints, the current Spanish diet with both the MDP and a typical Western dietary pattern. Studies that assessed food-related environmental impacts of mean food dietary patterns generally concluded that a shift towards less animal-based and more plant-based diets would have both a beneficial effect on climate and on the environment. It was found that the MDP had 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). In fact, it was observed that a shift towards a MDP would result in a reduction of the Spanish environmental footprint in any of the considered variables from 33 to 72 %. In contrast, a progressive shift towards a WDP would imply an increase in the footprints (12–72 %). These results reinforce the sustainable character of the MDP in an increasingly globalized world [31].

Although legumes are commonly recommended as environmentally friendly meat alternatives, other foods of vegetable origin contribute substantially (along with dairy products as is the case for the MDP and SCP) to either water (vegetable oils in particular, and to some extent nuts) or land usage (cereals and vegetable oils) [31]. In both the SCP and in the WDP, vegetable oils also contribute to a great extent to water and energy consumption footprints. However, animal-based foods were found to cause the highest environmental impact in all dietary patterns considered. As in other studies of the Spanish ecology, meat and dairy foods were the one that most contributed to environmental footprints, although at a much lower absolute level compared to the WDP. As far as GHG emissions and land usage were concerned, undoubtedly meat resulted as the food item that contributed the most compared to other foods, both in the WDP and SCP [31]. It was observed that a reduction in meat consumption decreased GHG emissions, and land usage, subsequently increasing the availability of land for other uses [32]. Even though there is high production variability, which may be as much of 80 % of global agriculture across countries, land use is closely related to livestock production and accounts for more than half of the GHG emissions resulting from agriculture. Meanwhile, dairy products, one of the main sources of animal protein in the MDP, contributed to a great extent in terms of energy consumption in the three dietary patterns. In the MDP, dairy products had the highest impact in all four analyzed footprints. In the MDP, meat had a lower weight compared to the other patterns both in frequency and amount. Regarding GHG emissions, fish showed a remarkable environmental contribution in all the dietary patterns. According to these results, adoption of the MDP in Spain would substantially reduce overall water consumption, despite a possible 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 a general conclusion, a shift from the current Spanish pattern towards the MDP would be beneficial from both a health and environmental perspective. The MDP presents lower footprints than the current Spanish pattern, and to a much larger extent than the WDP. The MDP results in a lower environmental impact due to the consumption of more plant-derived products and less animal products [31]. The MDP is presented as a cultural, health, and environmentally friendly model. 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.

Following the pioneer Keys' initiatives [33], three initial monographies around MD [34–36] drawn a way for further research and policies [37]. The initial focus on the heart survival and medical aspects [38, 39] was followed by a cultural approach and understanding [40–43] that focused on integrating the environmental sustainability and economical concerns [44, 45], particularly in times of financial constraints, with agricultural production [46, 47].

A Look to the Future: Economic Constraints

Improving global nutrition presents several challenges. The rise of obesity has been a rapidly growing problem with severe long-term health and economic consequences. Remarkably, even developed countries lower-income populations tend to be at higher risk for excess body weight. The economic constraints that developed countries are facing, after decades of wealth and development, seem to have paradoxically increased the prevalence of overweight and obesity, which are linked with poor nutrition. This is due to the reduced access to a balanced diet; the loss of traditional diets, such as the MD; and/or lower access to physical activity and sports facilities and resources [46].

Adoption of a specific diet is mainly determined by taste, convenience, and price, and higher adherence to the MD has been associated with higher dietary costs in adults [48]; other healthy dietary patterns are also more expensive than unhealthy choices [49, 50]. This partially explains why low diet quality is more often found in segments of the population with the lowest socioeconomic status (SES). Less is known about the association of monetary diet cost and healthy eating in children and youth, and about the relationship to parental SES. Studies in adult populations have shown that intakes of healthy nutrients and foods are consistently linked to more expensive diets. Adequate intakes of nutrients are paramount, especially for growing children. Therefore, it is of concern that the intake of key nutrients may be considerably lower in the less expensive diets. With this result in mind, it is not surprising that food consumption follows a similar monetary diet cost gradient. In a recent study by Schröder et al. [51, 52], higher consumption of nutrient-rich foods with low to medium energy density such as fruits, vegetables, and fish instead of nutrient-poor, energy-dense foods was more prevalent in high-cost diets and explains the overall lower energy density of these diets. It is of interest to note that energy density was also positively associated with monetary diet cost in German children aged 4–18 years.

A recently published meta-analysis including 27 studies conducted in adult populations showed that high-quality diets cost an average \$US 1.54 per 2000 kcal/day more than those with lesser quality [53–55]. The DONALD study, an open cohort study in German children and adolescents, reported a direct association between monetary diet cost and diet quality, but only in those participants with high-quality scores, defined as exceeding the median of the Nutrient Quality Index (NQI) and the Healthy Nutrition Score for Kids and Youth [56]. A study in Swedish children showed that higher diet quality, determined by the 2005 Healthy Eating Index, resulted in higher monetary diet cost [57]. The cost differential of 0.34€ between low and high diet quality found in the Swedish study was comparable with the findings in Spain [51].

Evidence from observational studies carried out in Greece and Spain indicates that higher adherence to the MD by adults is more expensive than higher compliances of westernized diet [48]. The KIDMED index was developed to determine MD adherence in youth [58]. Higher KIDMED scores have been associated with high nutrient adequacy, a healthier food consumption profile, and lower weight and abdominal adiposity [58–61]. In the Schröder et al. study [51], high adherence to the MD,

defined as a score more than 8 points on the KIDMED index, was significantly more expensive than low or medium adherence; scoring additional points did not further increase monetary diet cost. In contrast to the results of the DONALD study, this implies an association between increasing the quality of low- and medium-quality diets and higher monetary diet costs that do not apply to further enhancing high-quality diets.

In the Spanish study, the higher cost of the MD was driven by a significantly higher consumption of fish, fruits, and vegetables. In 2000, the average price of 100 g of these foods was 6.58€, 1.51€, and 1.33€, respectively. Prices for pastries, soft drinks, and sweets were considerably lower, but higher consumption of such energy-dense and nutrient-poor foods was strongly related to low MD adherence. Replacing 0.30€/1000 kcal of pastries and sweets with the same monetary cost of low-energy, nutrient-dense foods (specifically fruits, vegetables, and dairy) increased MD adherence by about 1 point [51]. This finding is of importance because even relatively small changes in MD adherence can strongly affect cardiovascular health in adults [62]. The PREDIMED study showed that a 1-point increase in the 14-point MD adherence questionnaire was associated with at least a 12.5 % decrease in CVD incidence [16, 62].

Swedish researchers reported higher monetary diet cost and quality with increasing SES of the parents [57], showing a considerable difference in monetary diet cost and adherence to the MD between extremes of parental education level. At first glance, it seems that 0.50€/2000 kcal/day in monetary diet cost between more and less favorable SES was not that great a difference. However, in a typical 2-child family this difference would total 672€/2000 kcal/year, without counting the parents' food intake. Following dietary recommendations that promote high consumption of low-energy but nutrient-dense foods such as fruits and vegetables and low consumption of nutrient-empty, energy-dense foods will increase diet quality but will also increase the monetary diet cost. This can be a major barrier to opting for healthy food, especially for families with a low SES. Therefore, it is not surprising that increasing monetary diet costs were associated with higher SES, accompanied by a substantial increase in diet quality [51]. However, the traditional MD should be considered the food way of the medium and lower social classes, as has been in the past, instead of a sophisticated and exclusive diet for reach people. Taken together, these considerations emphasize the need to reinforce the promotion of the MD in low-income populations and to facilitate access to key Mediterranean foods to high-risk families, especially during times of economic constraints.

Final Considerations

Governments need to commit themselves to undertake appropriate actions which preserve our traditional and cultural knowledge and lead to the diversity of foods and diets, but not focusing only on the health benefits that could be provided in the short and long term [63]. The recognition by UNESCO, with the consequent increased visibility and acceptance of the MD around the world, along with better and more scientific evidence regarding its benefits and effectiveness on longevity, quality of life, and disease prevention, has taken this dietary pattern to an unprecedented historical moment. This is a favorable situation that could possibly enable the strengthening of the MD around the world, thus potentiating improvements in global health indicators and in a reduction of environmental impact by production and transportation of food resources. To this end, the MD should be seen for what it is: an

Mediterranean diet pyramid: a lifestyle for today
guidelines for adult population

Serving size based on frugality
and local habits



Wine in moderation
and respecting social beliefs



Fig. 1.2 Mediterranean diet pyramid. *Source:* Bach-Faig A, Berry EM, Lairon D, Reguant J, Trichopoulou A, Dernini D, Medina FX, Battino M, Belahsen R, Miranda G, and Serra-Majem L, on behalf of the Mediterranean Diet Foundation Expert Group. Mediterranean diet pyramid today. Science and cultural updates. *Public Health Nutr.* 2011;14(12A):2274–84 [64]

extremely healthy and environmentally sustainable food model as well as an ancient cultural heritage that confers identity and belonging (Fig. 1.2) [64].

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