European Journal of Clinical Nutrition (2022) 76:179–183
https://doi.org/10.1038/s41430-021-00924-3

PERSPECTIVE

The tenth anniversary as a UNESCO world cultural heritage: an unmissable opportunity to get back to the cultural roots of the Mediterranean diet

Marialaura Bonaccio[1] · Licia Iacoviello[1,2] · Maria Benedetta Donati[1] · Giovanni de Gaetano[1]

Received: 12 March 2021 / Revised: 30 March 2021 / Accepted: 12 April 2021 / Published online: 18 May 2021

Abstract

In 2010, the Mediterranean diet was awarded the recognition of UNESCO as an Intangible Heritage of Humanity because of its complex interplay between several factors, including skills, knowledge, processing, cooking, and particularly the sharing and consumption of food. Also, the Mediterranean way of eating emphasizes local food, seasonality and biodiversity. Actually, all these aspects are almost completely neglected by the current nutrition research, which rather focuses on amount of food consumed by an individual or a given population but rarely simultaneously considers how foods are matched, whether they are locally-grown or consumed convivially. Basically, nutritional epidemiology usually ends up with classifying populations as highly or poorly adhering to a Mediterranean diet on the basis of the quantity of food consumed with poor or little knowledge on other features of this eating model. As such, this approach is likely to miss important information that could turn out to be as crucial for health as the traditional analysis of food intake. Since a global industrial food system has emerged, traditional diets are facing a global food challenge threating their own survival in the next decades. To transmit the Mediterranean heritage to future generations, it is important to get back to its roots by disentangling the complexity of this diet, which is not merely a healthful model to defeat chronic diseases and improve survival. The Mediterranean diet is a cultural heritage strictly tied to its people and territories. Nutritional epidemiology is now challenged to account for all these aspects in future health research.

The Mediterranean diet as intangible cultural heritage of humanity

November 16, 2020 marked the 10th anniversary since the Mediterranean diet (MD) was included in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity [1].

The health benefits of the MD have been supported by a large literature, which led to its recognition as the gold-standard of healthy nutrition; it is consistently associated with decreased morbidity and mortality, especially from cardiovascular causes, in both observational [2] and intervention studies [3]. A series of characteristics were acknowledged by UNESCO among which the following are worth mentioning:

1. The Mediterranean diet involves a set of skills, knowledge, rituals, symbols and traditions concerning crops, harvesting, fishing, animal husbandry, conservation, processing, cooking, and particularly the sharing and consumption of food.
2. Eating together is the foundation of its cultural identity.
3. It is a moment of social exchange.
4. Markets also play a key role as spaces for cultivating and transmitting the Mediterranean diet during the daily practice of exchange.

According to UNESCO, an MD is thus characterized by its culture and has an essential link with people and territories. Starting from these considerations, we should revise how these aspects recognized by UNESCO have been taken

✉ Marialaura Bonaccio
marialaura.bonaccio@moli-sani.org

[1] Department of Epidemiology and Prevention, IRCCS NEUROMED, Pozzilli (IS), Italy

[2] Department of Medicine and Surgery, Research Center in Epidemiology and Preventive Medicine (EPIMED), University of Insubria, Varese, Italy

into consideration by the epidemiological studies that so far have sustained the health advantages associated with an MD.

When measuring adherence to the MD at population level, we researchers have basically acquired data on the amount of food consumed by a given population through administration of validated questionnaires; we know exactly how many pears, apples, broccoli and mackerels are eaten, but very rarely we simultaneously match these data with a number of diet-related factors, such as the way such foods are cooked (e.g., fried, stewed) or matched with others (e.g., pasta with legumes or vegetables, wine at meals rather than binge drinking) or consumed convivially. Likewise, we have almost completely missed data on the type of food farming (organically or conventionally grown), the degree of industrial processing, nor are we aware of biodiversity of foods.

The importance of taking into account several other diet-related factors was also stressed by a revised Mediterranean Diet Pyramid which places seasonality, biodiversity, eco-friendliness, traditional and local food products at the bottom of the pyramid [4]. The main message is that a Mediterranean diet should fit today with the need of having more sustainable diets for the present and future generations, with a preference for seasonal, fresh and minimally processed foods to maximize the content of protective nutrients and substances in the diet.

Definitely, nutritional epidemiology ends up with considering a traditional MD as a sum of foods rather than a complex mixture of biodiversity, seasonality, local food production, cooking practices, skills and traditions.

This complex interplay among several aspects related to the MD is still almost completely neglected in the present health research and this clashes with the broader definition of the MD as provided by UNESCO 10 years ago.

Insights from the Moli-sani study

The follow-up of the Moli-sani study cohort [5] was designed to overcome, at least in part, the limitations mentioned above and has collected data on a number of dietary features capable to provide a more complete overview of participant's eating habits.

At the follow-up visit, along with a validated 188-item food frequency questionnaire to assess habitual food intake [6], 2001 subjects were also asked to indicate their own frequency of consumption of labeled organic foods, while locally-grown food intake was assessed by the use of an additional questionnaire aimed at capturing the origin of food consumed: this was intended as a proxy of the food supply chain length [5].

In such a way, besides a traditional assessment of adherence to an MD, based on amount and frequency of foods consumed daily, we had also additional knowledge on both use of pesticide-free and locally-grown foods. Of interest, we found that only 13.7% of subjects reported a relatively high adherence to a traditional MD (as reflected by a Mediterranean Diet Score above the population median of 4) combined with any consumption of organic food; similarly, those reporting both a good MD adherence and a consumption of locally-grown food were only 19.4% of the population. A good adherence to MD was more often associated with low intake of local food (26.8%) or no organic food intake (32.5%) (Fig. 1).

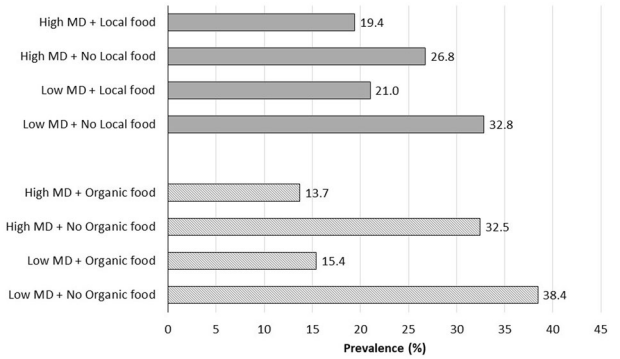

Fig. 1 Adherence to a traditional Mediterranean Diet and consumption of locally-grown or organic food among 2,001 participants of the Moli-sani Study cohort, Italy (2017–2020). High/low adherence to a Mediterranean diet (Mediterranean Diet Score above or below the population median of 4, respectively) combined with high consumption of locally-grown food or any organic food intake.

These data suggest that having a good adherence to MD does not necessarily mean being 'Mediterranean' as intended by the UNESCO. Despite not being expressively listed as a Mediterranean feature the use of organic food may be indirectly encompassed in the modern defense of the traditional Mediterranean way of living. Indeed, it is reasonable to acknowledge pesticide or heavy metals-free food products as part of the traditional MD as the one described by Ancel Keys before the mid-1960s, that is, before globalization had its influence on global lifestyle, including diet [7].

Ultra-processed food and the global challenge to traditional diets

In addition to these concerns, it is worth noting that, as every traditional diet, the MD is facing a global food challenge, as the industrial food system is emerging and strongly contributing to a worldwide transition towards eating models reportedly associated with non-communicable diseases and mortality [8–11].

While a fairly good amount of information has been gathered at the population level (e.g., preservative and pesticide use, population exposure to potentially harmful substances), at the individual level the data quality has

obviously been less detailed. The dietary questionnaires currently used in epidemiological studies render it hard to get information on how foods had been grown or transformed, nor which preservatives or pesticides had been used. Similarly, we are currently able, with some difficulty only, to address whether substituting a traditional diet based on minimally processed foods (*e.g.*, dried legumes or fresh fish) with a traditional diet based on the processed version of the same foods (e.g., ready-to-eat legume soup or fish nuggets) would have different impacts on long-term health outcomes [12].

Thus, future research should not only explore food or nutrients as standard entities, rather novel diet-related aspects such as processing [13]. Recent evidence from functional studies suggests that factors introduced during food processing can have an equally important health effect by promoting, for example, inflammation-related processes through diet–microbiome–host interactions, thus becoming risk factors for adverse health outcomes themselves [14, 15]. Moreover, food processing can lead to the loss of nutrients and phytochemicals naturally present in plant foods, such as antioxidants, which have health-promoting characteristics including anti-inflammatory, anti-diabetic, and hepatic effects as well as free radical scavenging [16].

Recent analyses from the Moli-sani study on 19,000 adult subjects indicated that cardiovascular risk reduction associated with MD was limited to advantaged socioeconomic groups, while being apparently ineffective among the weakest individuals [17]. In other words, a person from low socioeconomic status following a Mediterranean model, was unlikely to get the same heart advantages as a person with higher income, despite the fact that they both adhered similarly—according to a traditional dietary score—to the same healthy diet.

After further exploring such weird association, we found that, given a comparable adherence to the MD, the most advantaged groups were more likely to report a larger number of indices of diet quality, as opposed to people with low socioeconomic status. For example, within those having an optimal adherence to the MD, people with high income (or higher educational level) consumed foods richer in antioxidants and polyphenols, had a greater diversity in fruit and vegetable intakes and tended to consume more organic food as compared to conventionally grown foods [17].

A more detailed analysis of food may thus be crucial to reach a meaningful interpretation of these results. Although not directly assessed in that study, because of the methodological limitations already acknowledged, the way some staple foods of the MD are manufactured would potentially account for the observed differences in health advantages. As an example, olive oils containing high polyphenol concentrations, when compared with oils with lower amounts of polyphenols, resulted in a greater reduction in common cardiovascular risk factors, such as inflammatory biomarkers, a better protection of low-density lipoprotein-cholesterol (LDL-cholesterol) from oxidation, and a greater decrease in isoprostanes [18]. Also, extra-virgin olive oil has been shown to be more effective than ordinary olive oil in preventing cardiovascular diseases [19]. These and other differences pertaining to different olive oils, as well as those regarding many other foods, have been overlooked in many studies and may partly explain the socioeconomic disparities observed on long-term health outcomes.

In light of this, a novel, more multifaceted knowledge on food intake at population level is of crucial importance.

In conclusion, traditional nutrition epidemiology ends up with classifying individuals and populations as highly or poorly adhering to a given healthy diet, such as the MD, seldom differentiating people on the basis of a number of other food-related issues, linked to the industrial food system or the way such foods are prepared and consumed, possibly affecting the long-term relation of diet, health and disease.

Future perspectives

Given the complexity behind the broad concept of the MD, it is difficult to simply plan its material export to non-Mediterranean settings, since this would also imply to transfer a set of knowledge, skills and traditions that have been peculiar of the Mediterranean territories for centuries. Rather, it seems desirable that each Country rediscovers its own roots to build up a healthful nutrition model, as Authorities have been advocating for many decades [20] leading several Countries to complete this exercise and provide food-based dietary guidelines on a national level [21].

Indeed, several non-Mediterranean diets, such as the Nordic [22] or the Okinawa [23] ones which have been shown to be effective in reducing disease/mortality risk among the populations where they naturally originated, appeared less healthful in a Mediterranean Country such as Italy [24]. However challenging it might be, the transferability of the healthful traditional MD to non-Mediterranean settings characterized by poor cardio-protective food traditions, may be desirable [6]. The UNESCO recognition of the MD as a *cultural* heritage may be first seen as an invitation for each Country to rediscover its own eating traditions in order to renew a health agreement that binds food to its territory with notable advantages not only for people but also for the environment. This worldwide acknowledgment should serve as a universal indication to regain possession of the authentic meaning of the word ‘diet’, which is a Greek word (δίαιτα) to indicate ‘lifestyle’ but not a ‘list of foods’.

While maintaining the crucial importance of the cross-fertilization between food and culture, science and humanities, as shown by the introduction into the Mediterranean

basin of either tomatoes or dark chocolate, that should be firmly encouraged, we should also endorse the idea that a meaningful food exchange be accompanied by the more challenging exchange of the centenarian culture standing behind that food.

This should help avoiding that traditional foods end up becoming brand-new formulations with little or no nutritional value as in the case of pizza that, despite its Italian name and some original basic components, has become in the US a type of fast food, one of the top sources of calories, sodium and saturated fats, due to the preparation methods and toppings employed [7].

We should re-arrange the main message beyond the simple export of Mediterranean food to non-Mediterranean countries by stressing that along with extra-virgin olive oil, pasta and parmesan, we should also deliver a cultural model, a peculiar way of living that made the MD the most successful way to live longer and possibly disease-free.

On the other side, an effort should be made to understand how the traditional Mediterranean diet paradigm would benefit from the evaluation of healthful foods that are neither typical of a Mediterranean eating pattern nor included in the most common dietary scores, but are currently consumed by Mediterranean populations, as is the case of coffee, dark chocolate or spices [25].

In light of the above, we believe that a main direction to rule the planning of future research on MD, health and disease should develop methodologies to expand the traditional knowledge on diet, beyond assessment of amount and frequency of food consumed, to other food-related aspects and cultural behaviors, including skills, socio-economic status, values, food quality and processing, conviviality.

As Mediterranean people, we should ask ourselves whether we have been missing the true core of the Mediterranean cultural heritage for too long.

Compliance with ethical standards

Conflict of interest The authors declare no competing interest.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

References

1. UNESCO. Representative list of the intangible cultural heritage of humanity. Paris. (2010). Available at https://ich.unesco.org/doc/src/17331-EN.pdf (Accessed Feb 2021).
2. Dinu M, Pagliai G, Casini A, Sofi F. Mediterranean diet and multiple health outcomes: an umbrella review of meta-analyses of observational studies and randomised trials. Eur J Clin Nutr. 2018;72:30–43.
3. Estruch R, Ros E, Salas-Salvadó J, Covas MI, Corella D, Arós F, et al. Primary prevention of cardiovascular disease with a mediterranean diet supplemented with extra-virgin olive oil or nuts. N. Engl J Med. 2018;378:e34.
4. Bach-Faig A, Berry EM, Lairon D, Reguant J, Trichopoulou A, Dernini S, et al. Mediterranean diet pyramid today. Science and cultural updates. Public Health Nutr. 2011;14:2274–84.
5. Bonaccio M, Costanzo S, Di Castelnuovo A, Persichillo M, De Curtis A, Olivieri M, et al. The CASSIOPEA study (economic crisis and adherence to the Mediterranean diet: poSSIble impact on biomarkers of inflammation and metabolic phenotypes in the cohort of the Moli-sani study): rationale, design and characteristics of participants. Nutr Metab Cardiovasc Dis. 2021;31:1053–62.
6. Pisani P, Faggiano F, Krogh V, Palli D, Vineis P, Berrino F. Relative validity and reproducibility of a food frequency dietary questionnaire for use in the Italian EPIC centres. Int J Epidemiol. 1997;26 (Suppl 1):S152–60.
7. Martinez-Gonzalez MA, Hershey MS, Zazpe I, Trichopoulou A. Transferability of the Mediterranean diet to non-Mediterranean countries. What Is and what is not the Mediterranean diet. Nutrients 2017;9:1226.
8. Mendonça RD, Lopes AC, Pimenta AM, Gea A, Martinez-Gonzalez MA, Bes-Rastrollo M. Ultra-processed food consumption and the incidence of hypertension in a Mediterranean cohort: the seguimiento Universidad de Navarra Project. Am J Hypertens. 2017;30:358–66.
9. Fiolet T, Srour B, Sellem L, Kesse-Guyot E, Allès B, Méjean C, et al. Consumption of ultra-processed foods and cancer risk: results from NutriNet-Santé prospective cohort. BMJ 2018;360:k322.
10. Bonaccio M, Di Castelnuovo A, Costanzo S, De Curtis A, Persichillo M, Sofi F, et al. Ultra-processed food consumption is associated with increased risk of all-cause and cardiovascular mortality in the Moli-sani study. Am J Clin Nutr. 2021;113:446–55.
11. Pagliai G, Dinu M, Madarena MP, Bonaccio M, Iacoviello L, Sofi F. Consumption of ultra-processed foods and health status: a systematic review and meta-analysis. Br J Nutr. 2021;125:308–18.
12. Bonaccio M, Ruggiero E, Di Castelnuovo A, Costanzo S, Persichillo M, De Curtis A, et al. Fish intake is associated with lower cardiovascular risk in a Mediterranean population: Prospective results from the Moli-sani study. Nutr Metab Cardiovasc Dis. 2017;27:865–73.
13. Monteiro CA. Nutrition and health. The issue is not food, nor nutrients, so much as processing. Public Health Nutr. 2009;12:729–31.
14. Zinocker MK, Lindseth IA. The western diet-microbiome-host interaction and its role in metabolic disease. Nutrients 2018;10:365.
15. Wang DD, Nguyen LH, Li Y, Yan Y, Ma W, Rinott E, et al. The gut microbiome modulates the protective association between a Mediterranean diet and cardiometabolic disease risk. Nat Med. 2021;27:333–43.
16. Al-Juhaimi F, Ghafoor K, Özcan MM, Jahurul MHA, Babiker EE, Jinap S, et al. Effect of various food processing and handling methods on preservation of natural antioxidants in fruits and vegetables. J Food Sci Technol. 2018;55:3872–80.
17. Bonaccio M, Di Castelnuovo A, Pounis G, Costanzo S, Persichillo M, Cerletti C, et al. High adherence to the Mediterranean diet is associated with cardiovascular protection in higher but not in lower socioeconomic groups: prospective findings from the Moli-sani study. Int J Epidemiol. 2017;46:1478–87.
18. Hoffman R, Gerber M. Food processing and the mediterranean diet. Nutrients 2015;7:7925–64.
19. Buckland G, Travier N, Barricarte A, Ardanaz E, Moreno-Iribas C, Sánchez MJ, et al. Olive oil intake and CHD in the European Prospective investigation into cancer and nutrition spanish cohort. Br J Nutr. 2012;108:2075–82.

20. Dietary Guidelines Advisory Committee. Scientific Report of the 2020 Dietary Guidelines Advisory Committee: Advisory Report to the Secretary of Agriculture and the Secretary of Health and Human Services. U.S. Department of Agriculture, Agricultural Research Service, Washington, DC. (2020). Available at https://www.dietaryguidelines.gov/sites/default/files/2020-07/ScientificReport_of_the_2020DietaryGuidelinesAdvisoryCommittee_first-print.pdf (Accessed Feb 2021).
21. Food and Agriculture Organization of the United Nations. Food-based dietary guidelines. Available at http://www.fao.org/nutrition/education/food-dietary-guidelines/home/en/ (Accessed Feb 2021).
22. Roswall N, Sandin S, Löf M, Skeie G, Olsen A, Adami HO, et al. Adherence to the healthy Nordic food index and total and cause-specific mortality among Swedish women. Eur J Epidemiol. 2015;30:509–17.
23. Miyagi S, Iwama N, Kawabata T, Hasegawa K. Longevity and diet in Okinawa, Japan: the past, present and future. Asia Pac J Public Health. 2003;15(Suppl):S3–9.
24. Bonaccio M, Di Castelnuovo A, Costanzo S, De Curtis A, Persichillo M, Cerletti C, et al. Association of a traditional Mediterranean diet and non-Mediterranean dietary scores with all-cause and cause-specific mortality: prospective findings from the Moli-sani Study. Eur J Nutr. 2021;60:729–46.
25. Bonaccio M, Di Castelnuovo A, Costanzo S, Ruggiero E, De Curtis A, Persichillo M, et al. Chili pepper consumption and mortality in Italian Adults. J Am Coll Cardiol. 2019;74:3139–49.