



## The Portuguese mediterranean diet wheel: development considerations

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### Abstract

Scientific evidence has been reporting the health and environmental benefits of the Mediterranean diet. However, countries of the Mediterranean region, Portugal included, are gradually abandoning this traditional food pattern. The aim of the present work was to develop the Portuguese Mediterranean diet wheel. Three main steps were followed: (1) establishment of the most relevant Mediterranean diet and lifestyle principles to improve this pattern among the Portuguese population; (2) converting those principles into a captivating and easy to understand tool and (3) obtaining experts' opinion. By a matter of consistency, the preservation and transmission of the Mediterranean heritage was represented through an upgrade of the current Portuguese food wheel guide. This complementary tool highlights the Mediterranean diet enlarged character that encompasses a healthy lifestyle and reinforces sociocultural and environmental features. It was launched at the end of 2016 and was nationally disseminated with the support of the Portuguese Health Directorate. Initially it was presented in a poster format image that was subsequently spread in different communication formats. This newly developed Mediterranean food guide is a complementary educational tool that will support health and education professionals in the never ending mission of promoting healthy food choices.

**Key words:** Mediterranean diet: Food wheel: Nutrition Education: Food environment: Food guide

Portugal is referred to as a country with Mediterranean characteristics, not only because of its history, for their social and cultural practices, but also for their eating habits, very close to those who share the same latitude. Several Mediterranean elements are present in the fundamental features of climate, geography, culture and daily life of the Portuguese people<sup>(1)</sup>. The Mediterranean food pattern is a product of geography and history of the country<sup>(2)</sup>.

Despite the recognition that the concept of Mediterranean diet encompasses a heterogeneity of eating habits from a huge diversity of countries, some of its main characteristics have been identified and accepted as being part of a pattern to be preserved and encouraged<sup>(3,4)</sup>. The Mediterranean diet is mostly characterised by the predominance of plant products, including fruit, vegetables, cereals, nuts and pulses, and by the consumption of olive oil as the main source of fat. The regular but moderate consumption of wine, particularly at meal occasions, is also present. Although associated with moderate consumption, fish and dairy products are present in this food pattern. The preferential consumption of eggs, white meat (such as chicken, turkey and rabbit), together with the low consumption in frequency and quantity of red meat (namely bovine, swine, goat, sheep, equine and buffalo) and also

processed red meat, as well as sugar and sugary products, should be highlighted too<sup>(5)</sup>.

The concept began many decades ago by the hand of Ancel Keys, an American physiologist who deeply studied the relationship between diet and CVD, in particular, the impact of the food pattern observed in the Mediterranean region within the 50s and 60s of the 20th century (which he called the Mediterranean diet) when compared with food consumption practices of populations from other geographical areas<sup>(6)</sup>. Since then, this pattern has been widely studied by the scientific community that has showed its nutritional adequacy and association with a reduced risk of micronutrients deficiency<sup>(7,8)</sup>. Several studies have suggested the link between adherence to the Mediterranean food pattern and a greater degree of protection against all-cause mortality, in particular its protective role in the development of diseases such as malignant neoplasms, type 2 diabetes mellitus, metabolic syndrome, obesity, neuro-degenerative and CVD<sup>(9–15)</sup>.

The prevalence of obesity in the Portuguese population is high, meaning more than 50 % of the adults suffering from overweight<sup>(16)</sup>. In addition, inadequacy of the adopted eating habits is considered the main responsible factor by the years of life prematurely lost in Portugal<sup>(17)</sup>. According to estimates made under

**Abbreviation:** PNPAS, Program for the Promotion of Healthy Eating.

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the Global Burden of Disease (The Institute for Health Metrics and Evaluation) initiative, in 2014, inadequate eating habits were the risk factor that contributed the most to the total years of life lost by the Portuguese population, followed by arterial hypertension and overweight<sup>(18)</sup>. The health status of the Portuguese population aged between 25 and 74 years old, portrayed by the last National Health Survey with Physical Exam, was characterised by a high prevalence of chronic diseases such as hypertension, obesity and diabetes<sup>(19)</sup>. Unhealthy lifestyles, including inadequate nutrition, are known to be central determinants for these diseases, which highlights the importance of encouraging adherence to a healthy food pattern.

With the purpose of promoting and enhancing the Mediterranean food pattern, as well as supporting the international dissemination of this broader cultural expression, Portugal applied to the United Nations Educational, Scientific and Cultural Organization for the recognition of the Mediterranean Food Pattern as immaterial heritage of humanity, associated with countries such as Cyprus, Croatia, Greece, Spain, Italy and Morocco. The recognition by the United Nations Educational, Scientific and Cultural Organization took place in December 2013 (<https://ich.unesco.org/en/Decisions/8.COM/8-10>). It distinguishes the presence of the Mediterranean food heritage in Portugal as a cultural, historical and health model, reinforcing at the same time the importance of preserving and spreading this cultural heritage for the future.

However, recent scientific evidence has been reporting the gradual abandonment of the Mediterranean food pattern by the countries of the Mediterranean region. It is possible that, among other things, the region's progressive integration into the European Central Area and the cultural globalisation of food markets, and consequent social, political and economic changes, led to a change in dietary habits<sup>(4)</sup>. According to several experts, the Mediterranean region faces a period of 'nutritional transition' characterised by the coexistence of problems associated with malnutrition in parallel with obesity and pre-obesity, coinciding in many countries with growing social inequalities<sup>(20)</sup>. Between the sixties of the 20th century and the beginning of the 21st century, Portugal went from a subsistence food context to a social and food situation identical to that of Western societies<sup>(21)</sup>. According to the trend, Portugal also shows a decrease in the adherence to the Mediterranean food pattern<sup>(22,23)</sup>.

In this sense, it was necessary and important to improve the current national food guide that would support the promotion and valorisation of this food pattern among the Portuguese population.

## Methodology

The development of this Portuguese Mediterranean food guide followed three main steps:

### *Establishment of the most relevant Mediterranean diet and lifestyle principles*

Following the purposed aim, in 2015, methodological principles to the development of this new food guide were defined.

By a matter of consistency and simplicity of interpretation, it was proposed that the preservation and transmission of this heritage should be spread through an image based on the current national food guide. The Mediterranean food guide would be a complement but not a substitute of the Portuguese guide currently in use, the Portuguese food wheel that was launched in 2003 (Fig. 1) as an upgrade of the 1977 initial one<sup>(24)</sup>.

For this Mediterranean diet guide, the circle format would be adopted due to its association with the image of a plate and because people already recognise it from the previous national food guide. The serving dish is an important symbol of Portuguese culture, once eating around the table is still commonplace and very important. Its use also highlights and promotes the relevance of social interaction within food habits. Furthermore, it is thought that the groups in the circle format acquire similar importance as they visually complement each other. On the contrary, the pyramid format ranks groups, giving a false idea of hierarchy<sup>(24)</sup>.

In agreement with the previous food guide, in this new tool, food would be grouped not only according to the nutritional affinities but also with their use and importance in the Portuguese food panorama, while concomitantly exposing the recommended intake portions. Even if effectively developed for a population with Mediterranean characteristics and habits, and thus not distorting the concept associated with this food pattern, the pictorial representation of this previous guide did not make evident and noticeable its Mediterranean base.

In this context, it was decided that the former Portuguese food wheel guide would be updated taking into account the international accumulated scientific evidence of the Mediterranean lifestyle pattern health benefits and the characteristics of the Mediterranean food heritage in Portugal. Recognised by the United Nations Educational, Scientific and Cultural Organization (<https://ich.unesco.org/en/Decisions/8.COM/8-10>), such national heritage, expressed in several documents and summarised in ten main principles by the interministerial Monitoring Group for the Safeguarding and Promotion of the *Mediterranean Diet*, was relevant enough to be incorporated in this updated version<sup>(2,25)</sup>. This new guide would then underline not only dietary principles but also the Mediterranean diet enlarged character that encompasses a healthy lifestyle, reinforcing socio-cultural and environmental aspects as well, not taken into consideration in the previous one. In fact, the wheel format itself privileges the concept of complementarity and food balance associated with the Mediterranean essence declared in the sharing, leisure, and harmony at the table. Different relevant concepts were also included. The struggle against sedentary lifestyle and the time spent in leisure activities and in cooking were highlighted. Being part of daily routines, the potential of the meal moment for enhancing well-being and time spending with family had to be acknowledged. The promotion of healthy and traditional cooking techniques such as soups, stews, and casseroles should be encouraged, together with the incorporation of aromatic herbs in order to increase flavour and reduce salt usage. Besides, it was necessary to highlight the promotion of this lifestyle in order to maintain a more sustainable and closer relationship with the environment, and therefore to respect the seasonality as well as the local provenience of the food.





Fig. 1. The Portuguese food wheel (2003)<sup>(24)</sup>.

The Portuguese food wheel in force had already some foods in common with the Mediterranean dietary pattern, but it was necessary to highlight and show them in each food group. Other two products vastly associated with the Mediterranean diet, nuts and wine, were also included in adjacent messages to the wheel groups: appealing to the importance of nuts intake and making clear that if wine consumption occurs among adults, it has to be in moderation and only at meals. The image also reinforces that pregnant and breast-feeding women should not drink alcohol at all.

Subsequent to the establishment of such principles, to serve as its basis, the current Portuguese food guide could start to be renewed into the Mediterranean diet wheel (MDWheel).

*Converting the principles into a captivating and easy to understand tool*

For this task, the help of graphic designers was enlisted, in order to ensure that an appealing educational material was produced. Based on the settled principles, a pictorial guide started to be

conceived. Several versions were tested and discussed until one was found good enough to fulfill the pursued objective and turned into a poster to be easily disseminated.

On the top, this poster included not only the title – ‘Mediterranean diet wheel’ – but also a slogan appealing for the idea of dietary habits heritage and nutrition balance as a general recommendation – ‘Culture, tradition and balance!’

The central image of the existing national food guide, a colourful wheel divided into seven food groups and its central circle representative of water, was maintained but turned into a faded image. This gave relevance to the slices incorporated within each food group to highlight foods more related to the Portuguese Mediterranean dietary pattern.

Adjacent and below to the main wheel, the other relevant messages were included. Seven icons were developed and associated to the following sentences: (1) Choose local and seasonal foods; (2) Do not forget healthy gastronomy; (3) Share meals – Share traditions; (4) Use aromatic herbs; (5) Remember to include nuts; (6) Be active – Have fun and (7) If you are an adult and drink wine, do it in moderation and during meals – If you are pregnant or breast-feeding, do not drink alcohol.

A sentence reinforcing that the new tool was a complement and not a substitute of the national food guide in use was added at the end of the poster – ‘This graphic representation is a complement of the new Portuguese food wheel’.

#### *Obtaining experts' opinion*

The work in progress was recurrently shared and discussed with experts. Apart from some national personalities that were individually contacted, the group of lecturers from the Scientific Council of the Faculty of Food Sciences and Nutrition from the University of Porto have also contributed to the debate of several aspects concerning the final printable version. Such experts came from different scientific areas, including health and nutrition as well as education, history and sociology.

## Results

As a result, the Portuguese food wheel (2003)<sup>(24)</sup> was given a new image and transformed into The Portuguese Mediterranean diet wheel, launched at the end of 2016 (Fig. 2).

## Discussion and implications for research and practice

The Mediterranean food wheel presented in this paper can be seen as part of the strategy defined by the European Food and Nutrition Action Plan 2015–2020 and the National Program for the Promotion of Healthy Eating (PNPAS)<sup>(26,27)</sup>. Launched in 2014, the European action plan, on its fifth objective, clearly pointed out to the relevance of ‘(...) promoting, protecting or reinstating healthy and sustainable diets (high in vegetables, fruit and whole grains, with limited intake of saturated fat, trans fats, sugar and salt).’, emphasising the Mediterranean diet as being ‘(...) consistent with the characteristics of a healthy diet (...)’. Conveying complex scientific knowledge in a simple way to reach as many people as possible, food guides intend to facilitate healthier food choices. Through

the changing of food demand this work is also in line with the priority settled on objective 1 – ‘Create healthy food and drink environments’<sup>(26)</sup>. Similarly, when establishing their 2020 objectives, the national food policy, defined by the Ministry of Health through PNPAS, identified the Mediterranean diet as a reference food standard to be promoted among the Portuguese population in general and in the school environment and the most disadvantaged social groups in particular<sup>(27)</sup>.

Following this same direction, in 2017, a joint effort of the national Ministries of Health and Education has launched a framework on the relevance of extracurricular health education programmes to be used from the kindergarten to the end of secondary school. It is very important to highlight that the recognition of the Mediterranean diet as a healthy food pattern is within the objectives settled in this framework<sup>(28)</sup>. Moved by a similar drive, in 2018, the guidelines for the school canteens, issued by the Education Directorate, clearly state that schools have the duty to promote Mediterranean diet. In this sense, the document presents examples of feasible Mediterranean menus, reassuring the promotion of this healthy food pattern<sup>(29)</sup>.

In fact, since 2013, the Portuguese Ministry of Education included the Mediterranean diet topic as part of the curricular goals established for basic education, namely for the Natural Sciences syllabus (existing from the 5th to the 9th school years)<sup>(30,31)</sup>. The integration of the concept of the Mediterranean food pattern into the curricular goals of basic education allows the dissemination of concepts and behaviours associated to a healthy lifestyle, facilitating the pedagogical work around the promotion of health, especially among school children. However, in this context, two different food guides have been used in school textbooks, both the Portuguese food wheel and the Mediterranean diet pyramid<sup>(32,33)</sup>. As opposed to the Portuguese food wheel, the Mediterranean pyramid has the advantage of associating the social, environmental and lifestyle aspects with the notion of a healthy food pattern. Nevertheless, it should be noted that the simultaneous use of these two food guides in the same population is likely to promote confusion, as there is a divergence between the logic of the groups' composition and the number of portions presented. In the Mediterranean diet pyramid, for example, the potato is next to the red meats; whether in the Portuguese guide it is joined with rice and pasta, not only for its carbohydrates composition but also because it is usually consumed as a substitute. Moreover, the absence of weight quantification of the portions recommended in the Mediterranean diet pyramid impairs a genuine comparison. The importance of using pedagogical models that are clearly understood and not conflicting would better serve the hard task of transmitting the concepts associated with healthy eating choices. The use of the Mediterranean diet wheel instead of the Mediterranean diet pyramid will reduce cacophony among teachers and school-age children and intensify the awareness of adopting this traditional healthy lifestyle.

The diffusion of the Mediterranean diet wheel was initially made through the websites of the Portuguese Health Directorate and the University of Porto Faculty of Nutrition and Food Sciences. In particular, the PNPAS, one of the ministerial health priority programmes, takes a crucial role in this dissemination process.







Fig. 2. The Portuguese Mediterranean diet wheel (2016).

The enthusiastic comments and suggestions received by the public made it evolve to further educational materials, like the poster's English version (<https://bit.ly/2JWUJaR>) and an interactive version (<https://bit.ly/2k67410>). A compilation of all the materials related to this Mediterranean diet wheel can be accessed through the PNPAS website (<https://alimentacaosaudavel.dgs.pt/dieta-mediterranica/>). The media have as well been acquainted about this new educational tool, releasing some visual and written news about it. Some examples can be assessed at <https://bit.ly/2Y1D44A>; <https://bit.ly/2LFhbHD>; <https://bit.ly/2LJaFjk>.

In this way, the new tool was made freely available to both health professionals and the scientific community. It has reached

the main institutions and professionals responsible for health promotion: health centres, schools, canteens, nutritionists and teachers.

The frugal Mediterranean food pattern is known by its richness in vegetables and quality vegetable oils, and, particularly in Portugal, also by the great diversity of culinary techniques with good nutrient preservation by the use of confection water (soups, stews, boiled, etc)<sup>(25)</sup>. This pattern is characterised by a strong presence of protective substances with antioxidant and anti-inflammatory action, among which *n*-3 fatty acids, oleic acid and phenolic compounds take a noticeable role<sup>(34)</sup>. Moreover, Mediterranean diet is strongly associated with a

lower risk of multiple diseases (such as CVD, cancer, diabetes or obesity) appearing as the main causes of death and disability in Europe<sup>(25,34,35)</sup>. In spite of this, factual evidence has shown that Portugal is abandoning this traditional food pattern<sup>(4,22,23,36,37)</sup>. By innovating traditions and adapting them to the needs of contemporary life, it will be possible to ensure the continuity of knowledge and the collective memory of the region, as well as to positively influence the future public health outcomes.

Likewise occurred with the preceding Portuguese food wheel guide, it is believed that this Mediterranean food guide, as a complementary educational tool, will support health and education professionals in the never ending mission of promoting healthy food choices. By reinforcing the adherence to the Mediterranean food pattern, it is expected that this new tool would shape food demand and improve national food environment, which is particularly important to promote a healthier lifestyle among the Portuguese population.

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