



Adherence to Mediterranean diet: a public health paradox

Domenico Praticò

Department of Neural Sciences, Lewis Katz School of Medicine, Temple University, Philadelphia, PA, USA

ABSTRACT

Diet plays a fundamental role in our life starting from the earliest stages and throughout each phase of our existence. One diet that has garnered considerable attention in recent years is the Mediterranean diet. Named after the geographical region surrounding the Mediterranean Sea, which includes areas Greece, Spain and Southern Italy, it is one of the healthiest diets in the world since it is associated with significant lower risks for several non-transmissible chronic diseases. Despite this overwhelming evidence, recent data show a significant decrease in the popularity of this diet in the very countries that are considered the cradle of it, which is associated with an increase in metabolic diseases and obesity. Paradoxically, this diet is gaining more followers in countries that geographically are not part of the Mediterranean basin. This “Mediterranean diet paradox” highlights the urgent need for coordinated public health strategies aimed at correcting or reversing this shift within the Mediterranean region itself to avoid the long-term economic and public health consequences.

ARTICLE HISTORY

Received 10 April 2026
Revised 15 June 2026
Accepted 17 June 2026

KEYWORDS

Mediterranean diet; public health; lifestyle medicine; Mediterranean diet adherence; preventative medicine

Introduction

Diet is a fundamental determinant of human health across the entire life course, beginning in utero and extending through childhood, adulthood, and ageing (Darnton-Hill et al. 2004). Maternal nutrition during pregnancy plays a critical role in foetal development and long-term metabolic programming (Marshall et al. 2022), while dietary habits during childhood and adolescence are essential for optimal growth, cognitive development, and overall well-being (Norris et al. 2022). In adulthood and later life, diet becomes a major modifiable factor influencing healthy ageing, quality of life, and susceptibility to chronic non-communicable diseases (Tessier et al. 2025). Accumulating evidence from epidemiological, clinical, and mechanistic studies has established unhealthy dietary patterns as major contributors to obesity, cardiovascular disease, type 2 diabetes, cancer, and neurodegenerative disorders, whereas healthy dietary behaviours are associated with increased longevity and reduced disease burden (Schwingshackl et al. 2018; Jayedi et al. 2020; Shan et al. 2023).

The concept of diet has deep historical and cultural roots. The term derives from the ancient Greek word “*diáita*,” meaning “way of living” or “lifestyle,”

reflecting a broader understanding of health that extends beyond food intake alone (Jouanna 2016). In ancient Greek medicine, diet was considered one of the central pillars of health maintenance and disease prevention. Hippocrates, widely regarded as the father of medicine, emphasised the therapeutic role of nutrition through the well-known principle “Let food be thy medicine and medicine be thy food,” highlighting the close relationship between nutrition and health (Trajkovska Petkoska et al. 2025). This holistic perspective was later further developed by Galen and remained influential for centuries in shaping medical and philosophical approaches to health and lifestyle (Wilkins 2023).

Within this historical and cultural framework, the Mediterranean region developed dietary traditions characterised by high consumption of plant-based foods, olive oil as the principal source of fat, moderate intake of fish and dairy products, limited consumption of red meat, and strong social and cultural dimensions surrounding food practices (Lăcătușu et al. 2019). These traditional dietary habits, later conceptualised as the Mediterranean diet (MedDiet), became internationally recognised for their association with reduced mortality and lower incidence of chronic diseases (Dinu et al. 2018; Guasch-Ferré & Willett

2021). Originally observed in populations from countries such as Greece, Southern Italy, and other Mediterranean areas during the mid-twentieth century, the MedDiet has progressively become one of the most extensively studied dietary models worldwide (Guasch-Ferré & Willett 2021).

However, despite its global recognition as a healthy dietary pattern, Mediterranean countries themselves have undergone profound nutritional and lifestyle transitions over recent decades. Increasing urbanisation, globalisation of food systems, economic changes, and shifts in social behaviours have progressively promoted the adoption of westernised dietary patterns characterised by higher consumption of ultra-processed foods, refined carbohydrates, saturated fats, and sugar-sweetened beverages, alongside lower adherence to traditional Mediterranean eating habits (Dernini & Berry 2015; Clemente-Suárez et al. 2023). Paradoxically, while several Mediterranean populations are progressively moving away from their traditional dietary heritage, some non-Mediterranean countries have shown increasing adherence to Mediterranean-like dietary patterns due to growing awareness of their health benefits (da Silva et al. 2009).

The present review aims to examine the ongoing transition from traditional Mediterranean dietary habits towards westernised dietary patterns within Mediterranean countries, with particular attention to the sociocultural, nutritional, and epidemiological implications of this shift. Furthermore, the review explores the paradoxical evolution of dietary quality across different world regions, discussing how adherence to Mediterranean dietary principles may be declining in their regions of origin while simultaneously increasing in non-Mediterranean populations.

What is the Mediterranean diet?

The origins of the Mediterranean dietary pattern date back several millennia and are deeply intertwined with the environmental, agricultural, cultural, and socio-economic characteristics of the Mediterranean basin (Trichopoulou & Lagiou 1997; Capurso 2024). In its earliest forms, dietary habits in Mediterranean populations were primarily determined by food availability, seasonality, local agricultural practices, climatic conditions, and the relative scarcity of animal-based products (Bach-Faig et al. 2011). The populations inhabiting the Mediterranean coasts traditionally relied on foods that could be cultivated locally and sustainably within the region's characteristic environment, including olives, grapes, cereals, legumes, vegetables, fruits, nuts, and wild herbs (Davis et al. 2015). The widespread

use of olive oil, which later became one of the defining elements of the MedDiet, emerged largely because of the extensive cultivation of olive trees favoured by the Mediterranean climate (Uylaşer & Yildiz 2014).

The dietary traditions of the Mediterranean region were further shaped by the development of ancient civilisations, particularly the Greek and Roman cultures, which profoundly influenced food production, culinary practices, and concepts of health and lifestyle (Altomare et al. 2013). In ancient Greece, food was closely connected not only to subsistence but also to philosophy, medicine, and social life (Skiadas & Lascaratos 2001; Wilkins 2015). Cereals, bread, olive oil, wine, legumes, vegetables, and fish represented staple foods, while meat consumption remained relatively limited and was often associated with religious ceremonies or specific social occasions (Waterlow 1989). Similar dietary principles were later incorporated into Roman culture, which expanded agricultural systems and trade routes throughout the Mediterranean basin, facilitating the dissemination of foods, culinary traditions, and agricultural knowledge across different populations (Waterlow 1989; Capurso 2024).

Importantly, the dietary habits of Mediterranean populations were not homogeneous (Boujelbane et al. 2025). Considerable regional variations existed according to geography, religion, local biodiversity, economic conditions, and cultural influences. Coastal populations generally consumed larger amounts of fish and seafood, whereas inland communities relied more heavily on cereals, legumes, dairy products, and locally available vegetables (Vareiro et al. 2009). Nevertheless, despite these differences, Mediterranean dietary traditions shared several common characteristics, including a predominantly plant-based dietary structure, modest consumption of animal products, extensive use of olive oil, and reliance on minimally processed seasonal foods (Davis et al. 2015).

Only much later did these traditional dietary habits become conceptualised under the modern term “Mediterranean diet”. Initially, the concept did not describe a single standardised eating pattern but rather a collection of relatively heterogeneous dietary practices observed among populations living in Mediterranean regions such as Greece, Southern Italy, and Spain (Willett et al. 1995; Godos et al. 2024). Despite local variations, a broad scientific consensus later emerged identifying the traditional MedDiet as a dietary pattern characterised by high consumption of fruits, vegetables, legumes, nuts, whole grains, and olive oil; moderate intake of fish and dairy products; relatively low consumption of red meat and processed

foods; and moderate wine consumption during meals (Bach-Faig et al. 2011; Davis et al. 2015).

The world discover the Mediterranean diet

The first scientific recognition of the traditional Mediterranean dietary pattern is generally attributed to the epidemiologist Leland Allbaugh, who in 1953 published a nutritional and public health survey conducted on the island of Crete, commonly referred to as the “Rockefeller Report” (Hu et al. 2025). Initially expecting to document widespread malnutrition in the post-war Cretan population, Allbaugh instead described the local dietary habits as “surprisingly good” and noted the remarkably low prevalence of chronic diseases commonly observed in Western countries at that time. His observations highlighted a dietary pattern largely based on bread, olive oil, olives, cereals, legumes, vegetables, fruits, and relatively limited quantities of goat meat, dairy products, and fish (Trichopoulou 2022). Although the report did not yet define the concept of a “Mediterranean diet,” it represented one of the earliest scientific descriptions of the nutritional and health characteristics of traditional Mediterranean populations.

The study that most significantly contributed to the international scientific recognition of the MedDiet was the landmark “Seven Countries Study” initiated by Ancel Keys in 1958. This large epidemiological investigation compared dietary habits and cardiovascular disease incidence across populations from the United States, Finland, the Netherlands, Italy, Greece, the former Yugoslavia, and Japan. The findings demonstrated substantial differences in cardiovascular mortality among countries and showed that populations consuming dietary patterns rich in plant-based foods and olive oil, particularly in Mediterranean regions such as Greece and Southern Italy, exhibited markedly lower rates of coronary heart disease and all-cause mortality compared with Northern European and American populations (Keys 1997).

Beyond its scientific impact, the work of Keys and collaborators also contributed to popularising the Mediterranean lifestyle internationally. Through subsequent publications and public dissemination efforts, including books focused on nutrition, cardiovascular prevention, and lifestyle medicine, Keys promoted the concept of the “Mediterranean way of life” as a model associated with health and longevity (Keys et al. 1986).

As evidence supporting the health benefits of the MedDiet progressively accumulated, the concept

evolved from a regional dietary tradition into an internationally recognised nutritional model. In the early 1990s, the Harvard School of Public Health, together with the World Health Organization and other institutions, introduced the MedDiet pyramid as a practical representation of the major principles underlying this dietary pattern (Willett et al. 1995). Although the pyramid has undergone several modifications over time, its core characteristics have remained largely unchanged, emphasising high daily consumption of vegetables, fruits, legumes, whole grains, and olive oil; moderate intake of fish, dairy products, eggs, and poultry; and relatively low consumption of red meat and processed foods (Serra-Majem et al. 2020; Hu et al. 2025).

Importantly, the MedDiet is now recognised not only as a nutritional model but also as a broader cultural and social heritage. In 2010, the United Nations Educational, Scientific and Cultural Organization (UNESCO) officially recognised the MedDiet as an Intangible Cultural Heritage of Humanity, highlighting its social, cultural, agricultural, and gastronomic dimensions, including conviviality, traditional food practices, and intergenerational transmission of culinary knowledge (Trichopoulou 2021).

Health benefits of the Mediterranean diet: clinical and epidemiological evidence

Since the publication of the pioneering observations from the Rockefeller Foundation-supported studies and the subsequent work of Ancel Keys, the MedDiet has been widely recognised as one of the healthiest dietary patterns for promoting human health and longevity (Finicelli et al. 2022). Over the last several decades, a large body of epidemiological studies, randomised clinical trials, and meta-analyses has consistently demonstrated that adherence to the MedDiet is associated with a reduced risk of multiple chronic diseases and improved overall health outcomes (Sofi et al. 2008; Dinu et al. 2018).

Cardiovascular health

Following the original observations by Keys and colleagues, several major randomised clinical trials investigated the effects of the MedDiet on cardiovascular disease and lipid metabolism. Among these, the Lyon Diet Heart Study and the DART trial, two landmark secondary prevention studies, demonstrated a significant reduction in cardiovascular mortality and all-cause mortality among patients with previous

myocardial infarction who adhered to a Mediterranean dietary pattern (Burr et al. 1989).

Additional intervention studies have shown that adherence to the MedDiet improves endothelial function in patients with coronary artery disease, reduces circulating levels of low-density lipoprotein (LDL) cholesterol, and increases protective high-density lipoprotein (HDL) cholesterol concentrations in individuals at elevated cardiovascular risk (Hernández et al. 2017; Yubero-Serrano et al. 2020). Furthermore, a systematic review and meta-analysis of four randomised clinical trials involving 10,054 participants, with a mean age of 57 years and follow-up periods ranging from 2 to 7 years, demonstrated a statistically significant reduction in major adverse cardiovascular events among subjects following the MedDiet compared with control diets (Sebastian et al. 2024).

Metabolic health

The MedDiet has also demonstrated substantial benefits on several cardiometabolic risk factors, particularly type 2 diabetes (T2D). Consistent evidence supports an inverse association between adherence to the MedDiet and both the incidence and progression of T2D. Specifically, meta-analyses have reported that adherence to the MedDiet was associated with a 19–23% lower risk of developing T2D (Koloverou et al. 2014; Schwingshackl et al. 2015).

According to the American Diabetes Association, nutritional therapy in adults with diabetes should aim to promote healthy eating patterns capable of maintaining optimal body weight and glycemic control (Evert et al. 2013). In this context, adherence to the MedDiet has been associated with lower glycated haemoglobin (HbA1c) levels, improved insulin sensitivity, and overall better glycemic control (Esposito et al. 2015).

Overall, strong scientific evidence supports the notion that adherence to the MedDiet is inversely associated with both the risk and incidence of T2D (Wallerer et al. 2025). Moreover, in patients already affected by diabetes, the MedDiet contributes to improved metabolic control and a more favourable cardiovascular risk profile (Huo et al. 2015). From a mechanistic perspective, these beneficial effects are likely mediated through multiple pathways, including anti-inflammatory and antioxidant actions, improved insulin signalling, modulation of lipid metabolism, and favourable effects on gut microbiota composition and function (Billingsley & Carbone 2018; Koelman et al. 2022; Lauria et al. 2026).

Cancer prevention

Dietary habits are increasingly recognised as important modifiable factors influencing cancer risk (Marino et al. 2024). According to the World Cancer Research Fund, dietary patterns rich in fruits, vegetables, whole grains, and minimally processed foods, together with limited consumption of red and processed meats, represent one of the most effective nutritional strategies for cancer prevention (Vithayathil et al. 2025). These characteristics substantially overlap with the traditional MedDiet (Schwingshackl et al. 2020).

Consistent with this concept, numerous observational studies have reported an inverse association between adherence to the MedDiet and overall cancer risk in the general population (Schwingshackl et al. 2017). Meta-analyses further suggest that the MedDiet is associated with lower risk of several malignancies, including colorectal, head and neck, lung, liver, and bladder cancers (Morze et al. 2021).

The anticancer properties of the MedDiet have been attributed to several biological mechanisms, including its high content of dietary fibre, polyphenols, antioxidants, and anti-inflammatory phytochemicals (Morze et al. 2021). In addition, emerging evidence suggests that adherence to the MedDiet may influence telomere length and cellular ageing processes, which have been linked to cancer susceptibility (Canudas et al. 2020).

Brain health

Lifestyle-related factors, including dietary habits, are now recognised as important modifiable determinants of age-related cognitive decline and neurodegenerative diseases (Livingston et al. 2024). A growing body of literature indicates that long-term adherence to the MedDiet exerts beneficial effects on cognitive performance and brain health across the lifespan (Petersson & Philippou 2016; Fekete et al. 2025; Godos et al. 2025b).

Data from the PREDIMED clinical trial demonstrated a significant association between adherence to the MedDiet and lower risk of Alzheimer's disease and related dementias (Martínez-Lapiscina et al. 2013; Valls-Pedret et al. 2015). Similarly, analyses from the UK Biobank prospective cohort, involving approximately 60,000 participants, showed that greater adherence to the MedDiet was associated with reduced risk of cognitive decline and dementia independently of genetic predisposition (Shannon et al. 2023).

More recently, studies investigating the interplay among genetics, plasma metabolomics, and dietary

habits in large prospective cohorts, including the Nurses' Health Study and the Health Professionals Follow-up Study, further confirmed that long-term adherence to the MedDiet is strongly associated with lower dementia risk. Interestingly, these protective associations were also observed among carriers of the APOE ϵ 4 allele, the major genetic risk factor for Alzheimer's disease, and appeared consistent across sexes (Liu et al. 2025).

From global model to regional decline: the Mediterranean diet paradox

Over the past several decades, the MedDiet has become one of the most extensively investigated and scientifically supported dietary patterns worldwide (Trichopoulou et al. 2003). A large body of epidemiological, clinical, and mechanistic evidence has consistently associated adherence to the MedDiet with reduced risk of cardiovascular disease, metabolic disorders, obesity, type 2 diabetes, certain cancers, neurodegenerative diseases, and all-cause mortality (Dinu et al. 2018; Estruch et al. 2018). In addition to its health benefits, the MedDiet has also been recognised for its cultural value, environmental sustainability, and potential contribution to healthy ageing and longevity (Dernini & Berry 2015; Poursalehi et al. 2023).

The growing scientific consensus surrounding the benefits of the MedDiet has led to broad international recognition of this dietary pattern as a model for healthy nutrition (Lichtenstein et al. 2021). Reflecting this evidence base, the MedDiet has repeatedly been ranked among the healthiest dietary models globally by international expert panels evaluating dietary quality, nutritional adequacy, long-term sustainability, safety, and evidence-based clinical effectiveness (Martínez-González et al. 2015). Such recognition has contributed to the worldwide dissemination of Mediterranean dietary principles far beyond the geographical boundaries of the Mediterranean basin itself (Martínez-González et al. 2017).

Paradoxically, however, while the MedDiet has gained increasing popularity and scientific appreciation internationally, adherence to traditional Mediterranean dietary patterns has progressively declined within Mediterranean countries over recent decades. Several studies conducted across Southern European nations, including Greece, Italy, and Spain, have documented a gradual but substantial shift away from traditional dietary habits towards more westernised eating behaviours, particularly among younger generations (Grosso & Galvano 2016; Damigou et al. 2023). This nutritional transition is characterised by

increased consumption of ultra-processed foods, refined grains, saturated fats, red and processed meats, sugar-sweetened beverages, and energy-dense foods, accompanied by reduced intake of legumes, fruits, vegetables, and other traditional components of the MedDiet (Baker et al. 2020; Šarac et al. 2021).

The causes underlying this transition are multifactorial and include rapid urbanisation, globalisation of food markets, socioeconomic changes, aggressive food industry marketing, altered family and working structures, reduced time dedicated to home cooking, and the progressive replacement of traditional lifestyles with more sedentary behavioural patterns (Dernini & Berry 2015; Baker et al. 2020). Collectively, these factors have contributed to the erosion of long-standing food traditions that historically characterised Mediterranean populations (Lăcătușu et al. 2019).

Within this context, the concept of a "Mediterranean diet paradox" may be proposed to describe the apparent contradiction between the global promotion of the MedDiet as a gold-standard dietary model and the simultaneous abandonment of this dietary heritage in its countries of origin (Obeid et al. 2022). In contrast to earlier concepts such as the "French paradox," which referred to unexpectedly favourable cardiovascular outcomes despite the presence of certain risk factors, the Mediterranean diet paradox reflects the coexistence of two opposing phenomena: increasing international adoption of Mediterranean dietary principles and decreasing adherence among Mediterranean populations themselves (Ferrières 2004; Obeid et al. 2022). Consequently, countries historically recognised as the cradle of the MedDiet are progressively converging towards westernised dietary patterns associated with poorer nutritional quality and increased chronic disease risk (Jayedi et al. 2020; Clemente-Suárez et al. 2023).

A tale of two countries: diverging dietary trends in Italy and Sweden

Italy

Together with Greece, Spain, and other countries bordering the Mediterranean basin, Italy is traditionally considered one of the historical birthplaces of the MedDiet (Baroni et al. 2024). However, accumulating evidence indicates that adherence to traditional Mediterranean dietary patterns has progressively declined in Italy over recent decades, particularly among younger generations but also within the adult population (Vitale et al. 2021). Several studies have documented a gradual shift towards more westernised

dietary habits characterised by increased consumption of red and processed meats, ultra-processed foods, refined carbohydrates, and sugar-sweetened beverages, accompanied by reduced intake of fruits, vegetables, legumes, fish, and other traditional components of the MedDiet (Lotti et al. 2024).

Overall, surveys conducted in Italy using different adherence scores and assessment methodologies consistently indicate a medium-to-low adherence to the MedDiet within the general population. A 2024 study involving Italian university students aged 18–24 years reported that only approximately one-third of participants showed high adherence to the MedDiet (Franchini et al. 2025). Similarly, another large study, predominantly involving female participants, found that among 3,732 completed questionnaires only 5% of respondents exhibited high adherence to the MedDiet, while most individuals showed medium adherence (approximately 83%) and 12% demonstrated low adherence (Cardamone et al. 2024).

More recently, a study evaluating 10,916 Italian adults who completed the validated Medi-Lite questionnaire between January 2019, and December 2022 demonstrated a significant decline in adherence to the MedDiet over time ($p < 0.001$) (Lotti et al. 2024). Collectively, these findings suggest that adherence to traditional Mediterranean dietary patterns in Italy remains suboptimal, with only a minority of the population maintaining high adherence levels.

Importantly, this nutritional transition parallels the increasing prevalence of obesity and metabolic disorders observed in the Italian population. Recent national estimates indicate that overweight and obesity affect approximately 30% of children, 23% of adolescents, and 43% of adults in Italy. Although multiple socioeconomic and lifestyle factors contribute to these trends, the progressive abandonment of traditional Mediterranean dietary habits likely represents an important contributing factor (Lotfi et al. 2022).

Sweden

In contrast to the declining adherence observed in several Mediterranean countries, some Northern European populations appear to be increasingly adopting dietary behaviours that align with Mediterranean nutritional principles (Bach-Faig et al. 2011). Although direct studies specifically evaluating adherence to the MedDiet in Sweden remain limited, available evidence suggests growing interest in plant-based and health-oriented dietary patterns sharing several characteristics with the traditional MedDiet (Krzynarić et al. 2021; Vepsäläinen & Lindström 2024).

A 2014 multicentre European study investigating adherence to a Mediterranean-like dietary pattern among children reported that Swedish participants showed the highest adherence scores among the countries evaluated, characterised by frequent consumption of fruits, vegetables, cereals, and nuts (Tognon et al. 2014). Interestingly, children from Cyprus, historically considered one of the Mediterranean regions most closely associated with the traditional MedDiet, displayed the lowest adherence scores (Tognon et al. 2014). Furthermore, greater adherence to a Mediterranean-like dietary pattern was associated with approximately 15% lower prevalence of childhood obesity independently of age, sex, socioeconomic status, and country of residence (Tognon et al. 2014).

Several factors may contribute to this trend in Sweden, including increasing public awareness regarding environmental sustainability, preventive health, and food quality (Trolle et al. 2024; Vepsäläinen & Lindström 2024). In recent years, younger Swedish generations have shown growing preference for plant-based and environmentally sustainable food choices, contributing to increased availability and consumption of foods consistent with Mediterranean dietary principles (Eustachio Colombo et al. 2021).

This tendency is also reflected in national public health recommendations. In 2025, the Swedish National Food Agency updated its dietary guidelines emphasising high consumption of vegetables, fruits, legumes, whole grains, and fish, while recommending reduced intake of sugar-sweetened beverages, sweets, snacks, and foods high in sugar, salt and saturated fat). Although the guidelines do not explicitly refer to the MedDiet, many of their core nutritional principles substantially overlap with those traditionally associated with Mediterranean dietary patterns (Hu et al. 2025). The convergence between sustainability-oriented Nordic dietary recommendations and Mediterranean nutritional principles highlights how healthy and environmentally sustainable dietary models may increasingly share common characteristics across different geographic regions (Krzynarić et al. 2021).

Taken together, these observations illustrate an emerging and potentially paradoxical nutritional phenomenon. While several Mediterranean countries are progressively moving away from traditional Mediterranean dietary patterns, some non-Mediterranean populations appear to be increasingly adopting dietary behaviours consistent with Mediterranean nutritional principles (Krzynarić et al. 2021; Obeid et al. 2022). Importantly, this shift is often driven not only by health considerations but also by growing awareness

of environmental sustainability, preventive medicine, and long-term public health strategies (Trolle et al. 2024; Vepsäläinen & Lindström 2024). Consequently, adherence to Mediterranean-like dietary models may now be improving in certain Northern European populations while simultaneously declining in parts of the Mediterranean basin historically considered the cradle of the MedDiet (Obeid et al. 2022).

What are the drivers of the shift away from the Mediterranean diet?

Over the last two decades several Mediterranean countries, including Italy, Greece, and Spain, have experienced a gradual but persistent decline in adherence to the traditional MedDiet (Yesildemir et al. 2025). Although the exact causes underlying this nutritional transition remain complex and multifactorial, several interconnected socioeconomic, cultural, environmental, and lifestyle-related factors likely contribute to the progressive abandonment of traditional Mediterranean dietary patterns. Importantly, while much of the available evidence derives from studies conducted in Italy, many of these determinants are likely shared across other Mediterranean basin countries undergoing similar dietary and societal transitions (Dernini & Berry 2015).

One of the major contributing factors involves economic barriers associated with maintaining a traditional Mediterranean dietary pattern (Sam-Yellowe 2024). The MedDiet relies heavily on regular consumption of fresh fruits and vegetables, legumes, fish, nuts, and extra-virgin olive oil, foods that have become increasingly expensive in recent years (Godos et al. 2025a). Inflation, rising food production costs, and global supply chain instability have substantially increased the price of many high-quality fresh ingredients traditionally central to the MedDiet (Reeves et al. 2017; Azimi et al. 2024). In contrast, ultra-processed foods, refined carbohydrates, and energy-dense products rich in sugar and saturated fats are often more affordable, widely accessible, and heavily promoted. Consequently, economic inequalities may significantly influence dietary choices, particularly among lower-income households (Sinai et al. 2021).

Closely related to this issue is the concept of food security and accessibility. A recent study investigating the relationship between food security and adherence to the MedDiet evaluated factors such as economic resources, accessibility to Mediterranean foods, employment status, and area of residence (Scazzina et al. 2025). The findings demonstrated that individuals reporting difficulties accessing recommended

Mediterranean foods or living in rural or socioeconomically disadvantaged areas were less likely to adhere to the MedDiet, whereas households with higher monthly incomes showed greater adherence (Tsofliou et al. 2022). These observations suggest that both economic capacity and food accessibility play important roles in shaping dietary behaviours (Darmon & Drewnowski 2015). Moreover, ongoing environmental and climate-related challenges, including droughts, extreme weather events, and reduced agricultural productivity, may further compromise the availability and affordability of key Mediterranean food products (Michelsoni et al. 2025).

Another major driver of this transition is the growing globalisation of food systems and the increasing diffusion of westernised dietary models. Over recent decades, multinational food corporations and globalised food markets have profoundly transformed eating behaviours worldwide, including within Mediterranean countries (Baker et al. 2020). The widespread expansion of fast-food chains and highly processed food products has promoted dietary habits characterised by convenience, palatability, aggressive marketing, and high caloric density (Popkin 2015). In particular, younger generations are increasingly exposed to Western-style dietary patterns rich in processed meats, refined grains, sugar-sweetened beverages, and ultra-processed foods, often at the expense of traditional home-prepared meals (McCarthy et al. 2022). The proliferation of international fast-food chains throughout Mediterranean urban centres represents a visible manifestation of this broader nutritional globalisation process (Ambikapathi et al. 2022).

Profound societal and lifestyle changes have also contributed substantially to the progressive shift away from traditional Mediterranean eating habits (Biggi et al. 2024). Rapid urbanisation, industrialisation, and modernisation have reshaped family structures, working conditions, and daily routines across Mediterranean societies (Popkin 2015). Compared with previous generations, contemporary lifestyles are generally characterised by faster-paced schedules, longer working hours, reduced time dedicated to meal preparation, and increased reliance on convenience foods (Tsofliou et al. 2022). Traditional Mediterranean meals often require time-intensive preparation using fresh and minimally processed ingredients, whereas ready-to-eat and ultra-processed foods offer rapid and convenient alternatives more compatible with modern lifestyles (Mengi Çelik et al. 2025). As a result, the demand for processed and pre-packaged foods has increased considerably, while interest in traditional culinary practices and home cooking has progressively declined (Tharrey et al. 2020).

In addition to these economic and structural determinants, cultural and generational changes appear to play an increasingly important role. Among younger populations, traditional dietary practices may sometimes be perceived as outdated, less attractive, or incompatible with contemporary lifestyles and social trends (Sproesser et al. 2019). This gradual erosion of traditional food culture is further amplified by sophisticated marketing strategies implemented by multinational food industries, particularly through digital media and social platforms targeting adolescents and young adults (Kucharczuk et al. 2022). The promotion of westernised food products is frequently associated with concepts such as convenience, modernity, social identity, and globalisation, potentially reducing the cultural appeal of traditional Mediterranean dietary habits (Mc Carthy et al. 2022).

Importantly, these factors do not act independently but rather interact synergistically within the broader framework of the global nutrition transition. Economic pressures, urbanisation, globalisation of food systems, technological changes, aggressive food marketing, and sociocultural transformation collectively contribute to the progressive replacement of traditional dietary models with westernised eating behaviours (Popkin & Ng 2022). Consequently, Mediterranean countries currently face the paradoxical challenge of preserving a dietary heritage internationally recognised as one of the healthiest nutritional models while simultaneously experiencing declining adherence within their own populations (Obeid et al. 2022).

Strategies to promote Mediterranean diet adherence

The progressive decline in adherence to the MedDiet across Mediterranean countries raises important public health concerns, particularly in light of the parallel increase in obesity, metabolic disorders, cardiovascular diseases, and other non-communicable chronic conditions (Dinu et al. 2018). Although reversing this nutritional transition represents a major societal challenge, several strategies may contribute to preserving and promoting traditional Mediterranean dietary habits, especially among younger generations (Iaccarino Idelson et al. 2017; Chatterjee & Nirgude 2024).

One of the most important interventions involves improving nutritional education and health literacy at the population level. Educational initiatives aimed at increasing awareness of healthy dietary behaviours should begin early in life and continue throughout adulthood (Chatterjee & Nirgude 2024). In this

context, schools, universities, healthcare systems, and public institutions may play a critical role in promoting knowledge regarding the health benefits of the MedDiet and the risks associated with westernised dietary patterns (Razavi et al. 2021; Abreu et al. 2023). Importantly, educational strategies should not focus exclusively on nutrients or disease prevention but should also emphasise broader concepts related to healthy lifestyles, food quality, culinary traditions, and long-term wellbeing (Rosi et al. 2025).

Given the growing interest in environmental sustainability among younger populations, future educational campaigns may also benefit from integrating sustainability-related messages into nutritional recommendations (Dos Santos et al. 2022; Abo-Khalil 2024). In addition to its well-established health benefits, the MedDiet is increasingly recognised as a relatively sustainable dietary model characterised by lower environmental impact compared with westernised diets rich in red meat and ultra-processed foods (Bôto et al. 2022; Lorca-Camara et al. 2024). Greater awareness regarding the relationship between dietary choices, environmental sustainability, climate change, and planetary health may therefore represent an additional motivational factor encouraging adherence to Mediterranean dietary principles (Martini et al. 2021).

Public health policies and institutional support are also likely to play a crucial role in reversing current trends. Governmental initiatives aimed at improving access to healthy foods, supporting local agricultural systems, reducing the economic barriers associated with fresh Mediterranean products, and regulating the marketing of unhealthy ultra-processed foods may contribute substantially to improving dietary quality at the population level (Hawkes et al. 2013; Hansen et al. 2022). Furthermore, the implementation of nutritional programs within school cafeterias, workplaces, hospitals, and community settings could facilitate wider adoption of Mediterranean-style dietary habits across different age groups and socioeconomic backgrounds (Niebylski et al. 2014; Maderuelo-Fernandez et al. 2015).

The contemporary digital environment may additionally offer new opportunities for large-scale dissemination of nutritional education. Social media platforms, digital communication tools, and online educational campaigns have the potential to reach broad audiences rapidly and may represent effective instruments for promoting healthy eating behaviours, particularly among adolescents and young adults who are highly exposed to digital marketing and online food-related content (Chau et al. 2018; Sina et al. 2022; Kulandaivelu et al. 2023).

Importantly, preserving the MedDiet should not be viewed solely as a nutritional objective but also as an effort to protect an important cultural and social heritage (Trichopoulou 2021). Traditional Mediterranean dietary practices encompass not only food selection but also culinary knowledge, meal preparation, conviviality, and intergenerational transmission of cultural values (Perrone et al. 2025). Consequently, strategies aimed at promoting the MedDiet may provide benefits extending beyond metabolic health, including positive effects on social cohesion, cultural identity, environmental sustainability, and overall quality of life (Lorca-Camara et al. 2024; Perrone et al. 2025).

Conclusions

The MedDiet remains one of the most scientifically supported dietary models for the prevention of chronic diseases and the promotion of healthy ageing. Nevertheless, despite its historical origins within Mediterranean populations, adherence to traditional Mediterranean dietary patterns has progressively declined across several Mediterranean countries over recent decades. This nutritional transition appears to be driven by a complex interaction of economic, sociocultural, environmental, and lifestyle-related factors that collectively favour the adoption of westernised dietary behaviours.

Paradoxically, while Mediterranean populations increasingly move away from their traditional dietary heritage, several non-Mediterranean countries are progressively adopting dietary models that share many Mediterranean nutritional principles, often motivated by both health and sustainability considerations. This “Mediterranean diet paradox” highlights the urgent need for coordinated public health strategies aimed at preserving and promoting traditional healthy dietary patterns within the Mediterranean region itself. Future efforts should therefore focus on improving nutritional education, supporting sustainable food systems, increasing accessibility to healthy foods, and promoting policies capable of preserving the cultural and health-related value of the Mediterranean diet for future generations.

Disclosure statement

No potential conflict of interest was reported by the author.

Author contributions

CRedit: **Domenico Praticò**: Conceptualization, Data curation, Supervision, Writing – original draft, Writing – review & editing.

Funding

The author(s) reported there is no funding associated with the work featured in this article.

References

- Abo-Khalil AG. 2024. Integrating sustainability into higher education challenges and opportunities for universities worldwide. *Heliyon*. 10(9):e29946. <https://doi.org/10.1016/j.heliyon.2024.e29946>
- Abreu F et al. 2023. Mediterranean diet adherence and nutritional literacy: an observational cross-sectional study of the reality of university students in a COVID-19 pandemic context. *BMJ Nutr Prev Health*. 6(2):221–230. <https://doi.org/10.1136/bmjnp-2023-000659>
- Altomare R et al. 2013. The mediterranean diet: a history of health. *Iran J Public Health*. 42(5):449–457.
- Ambikapathi R et al. 2022. Global food systems transitions have enabled affordable diets but had less favourable outcomes for nutrition, environmental health, inclusion and equity. *Nat Food*. 3(9):764–779. <https://doi.org/10.1038/s43016-022-00588-7>
- Azimi MN, Rahman MM, Maraseni T. 2024. The interplay of dietary habits, economic factors, and globalization: assessing the role of institutional quality. *Nutrients*. 16(18):3116. <https://doi.org/10.3390/nu16183116>
- Bach-Faig A et al. 2011. Mediterranean diet pyramid today. Science and cultural updates. *Public Health Nutr*. 14(12A):2274–2284. <https://doi.org/10.1017/S1368980011002515>
- Baker P et al. 2020. Ultra-processed foods and the nutrition transition: global, regional and national trends, food systems transformations and political economy drivers. *Obes Rev*. 21(12):e13126. <https://doi.org/10.1111/obr.13126>
- Baroni L et al. 2024. Nutrient composition of four dietary patterns in Italy: results from an online survey (the INVITA study). *Foods*. 13(13):2103. <https://doi.org/10.3390/foods13132103>
- Biggi C et al. 2024. Drivers and barriers influencing adherence to the Mediterranean diet: a comparative study across five countries. *Nutrients*. 16(15):2405. <https://doi.org/10.3390/nu16152405>
- Billingsley HE, Carbone S. 2018. The antioxidant potential of the Mediterranean diet in patients at high cardiovascular risk: an in-depth review of the PREDIMED. *Nutr Diabetes*. 8(1):13. <https://doi.org/10.1038/s41387-018-0025-1>
- Bôto JM, Rocha A, Miguéis V, Meireles M, Neto B. 2022. Sustainability dimensions of the Mediterranean diet: a systematic review of the indicators used and its results. *Adv Nutr*. 13(5):2015–2038. <https://doi.org/10.1093/advances/nmac066>
- Boujelbane MA et al. 2025. Regional variations in Mediterranean diet adherence: a sociodemographic and lifestyle analysis across Mediterranean and non-Mediterranean regions within the MEDIET4ALL project. *Front Public Health*. 13:1596681. <https://doi.org/10.3389/fpubh.2025.1596681>
- Burr ML et al. 1989. Effects of changes in fat, fish, and fibre intakes on death and myocardial reinfarction: diet and reinfarction trial (DART). *Lancet*. 2(8666):757–761. [https://doi.org/10.1016/s0140-6736\(89\)90828-3](https://doi.org/10.1016/s0140-6736(89)90828-3)

- Canudas S et al. 2020. Mediterranean diet and telomere length: a systematic review and meta-analysis. *Adv Nutr.* 11(6):1544–1554. <https://doi.org/10.1093/advances/nmaa079>
- Capurso A. 2024. The Mediterranean diet: a historical perspective. *Aging Clin Exp Res.* 36(1):78. <https://doi.org/10.1007/s40520-023-02686-3>
- Cardamone E et al. 2024. Adherence to Mediterranean Diet and its main determinants in a sample of Italian adults: results from the ARIANNA cross-sectional survey. *Front Nutr.* 11:1346455. <https://doi.org/10.3389/fnut.2024.1346455>
- Chatterjee P, Nirgude A. 2024. A systematic review of school-based nutrition interventions for promoting healthy dietary practices and lifestyle among school children and adolescents. *Cureus.* 16(1):e53127. <https://doi.org/10.7759/cureus.53127>
- Chau MM, Burgermaster M, Mamykina L. 2018. The use of social media in nutrition interventions for adolescents and young adults—a systematic review. *Int J Med Inform.* 120:77–91. <https://doi.org/10.1016/j.ijmedinf.2018.10.001>
- Clemente-Suárez VJ, Beltrán-Velasco AI, Redondo-Flórez L, Martín-Rodríguez A, Tornero-Aguilera JF. 2023. Global impacts of western diet and its effects on metabolism and health: a narrative review. *Nutrients.* 15(12):2749. <https://doi.org/10.3390/nu15122749>
- Damigou E et al. 2023. Adherence to a Mediterranean type of diet in the world: a geographical analysis based on a systematic review of 57 studies with 1,125,560 participants. *Int J Food Sci Nutr.* 74(8):799–813. <https://doi.org/10.1080/09637486.2023.2262781>
- Darmon N, Drewnowski A. 2015. Contribution of food prices and diet cost to socioeconomic disparities in diet quality and health: a systematic review and analysis. *Nutr Rev.* 73(10):643–660. <https://doi.org/10.1093/nutrit/nuv027>
- Darnton-Hill I, Nishida C, James WPT. 2004. A life course approach to diet, nutrition and the prevention of chronic diseases. *Public Health Nutr.* 7(1A):101–121. <https://doi.org/10.1079/phn2003584>
- Davis C, Bryan J, Hodgson J, Murphy K. 2015. Definition of the Mediterranean diet; a literature review. *Nutrients.* 7(11):9139–9153. <https://doi.org/10.3390/nu7115459>
- da Silva R et al. 2009. Worldwide variation of adherence to the Mediterranean diet, in 1961–1965 and 2000–2003. *Public Health Nutr.* 12(9A):1676–1684. <https://doi.org/10.1017/S1368980009990541>
- Dernini S, Berry EM. 2015. Mediterranean diet: from a healthy diet to a sustainable dietary pattern. *Front Nutr.* 2:15. <https://doi.org/10.3389/fnut.2015.00015>
- Dinu M, Pagliai G, Casini A, Sofi F. 2018. Mediterranean diet and multiple health outcomes: an umbrella review of meta-analyses of observational studies and randomised trials. *Eur J Clin Nutr.* 72(1):30–43. <https://doi.org/10.1038/ejcn.2017.58>
- Dos Santos EB, da Costa Maynard D, Zandonadi RP, Raposo A, Botelho RBA. 2022. Sustainability recommendations and practices in school feeding: a systematic review. *Foods.* 11(2):176. <https://doi.org/10.3390/foods11020176>
- Esposito K et al. 2015. A journey into a Mediterranean diet and type 2 diabetes: a systematic review with meta-analyses. *BMJ Open.* 5(8):e008222. <https://doi.org/10.1136/bmjopen-2015-008222>
- Estruch R et al. 2018. Primary prevention of cardiovascular disease with a mediterranean diet supplemented with extra-virgin olive oil or nuts. *N Engl J Med.* 378(25):e34. <https://doi.org/10.1056/NEJMoa1800389>
- Eustachio Colombo P, Elinder LS, Lindroos AK, Parlesak A. 2021. Designing nutritionally adequate and climate-friendly diets for omnivorous, pescatarian, vegetarian and vegan adolescents in Sweden using linear optimization. *Nutrients.* 13(8):2507. <https://doi.org/10.3390/nu13082507>
- Evert AB et al. 2013. Nutrition therapy recommendations for the management of adults with diabetes. *Diabetes Care.* 36(11):3821–3842. <https://doi.org/10.2337/dc13-2042>
- Fekete M et al. 2025. The role of the Mediterranean diet in reducing the risk of cognitive impairment, dementia, and Alzheimer's disease: a meta-analysis. *Geroscience.* 47(3):3111–3130. <https://doi.org/10.1007/s11357-024-01488-3>
- Ferrières J. 2004. The French paradox: lessons for other countries. *Heart.* 90(1):107–111. <https://doi.org/10.1136/heart.90.1.107>
- Finicelli M, Di Salle A, Galderisi U, Peluso G. 2022. The Mediterranean diet: an update of the clinical trials. *Nutrients.* 14(14):2956. <https://doi.org/10.3390/nu14142956>
- Franchini C et al. 2025. A nationwide survey of Italian university students: exploring the influences of sustainable dietary behaviors, lifestyle, and sociodemographic factors on adherence to the mediterranean diet. *Nutrients.* 17(12):1988. <https://doi.org/10.3390/nu17121988>
- Godos J et al. 2025a. Mediterranean diet and quality of life in adults: a systematic review. *Nutrients.* 17(3):577. <https://doi.org/10.3390/nu17030577>
- Godos J et al. 2025b. Role of Mediterranean diet in the prevention of cognitive decline: biological mechanisms behind longevity promotion. *Med J Nutrition Metab.* 18(4):227–243.
- Godos J et al. 2024. Underrated aspects of a true Mediterranean diet: understanding traditional features for worldwide application of a “Planeterranean” diet. *J Transl Med.* 22(1):294. <https://doi.org/10.1186/s12967-024-05095-w>
- Grosso G, Galvano F. 2016. Mediterranean diet adherence in children and adolescents in southern European countries. *NFS J.* 3:13–19. <https://doi.org/10.1016/j.nfs.2016.02.004>
- Guasch-Ferré M, Willett WC. 2021. The Mediterranean diet and health: a comprehensive overview. *J Intern Med.* 290(3):549–566. <https://doi.org/10.1111/joim.13333>
- Hansen KL, Golubovic S, Eriksen CU, Jørgensen T, Toft U. 2022. Effectiveness of food environment policies in improving population diets: a review of systematic reviews. *Eur J Clin Nutr.* 76(5):637–646. <https://doi.org/10.1038/s41430-021-01008-y>
- Hawkes C, Jewell J, Allen K. 2013. A food policy package for healthy diets and the prevention of obesity and diet-related non-communicable diseases: the NOURISHING framework. *Obes Rev.* 14 Suppl 2:159–168. <https://doi.org/10.1111/obr.12098>
- Hernández Á et al. 2017. The Mediterranean Diet decreases LDL atherogenicity in high cardiovascular risk individuals: a randomized controlled trial. *Mol Nutr Food Res.* 61(9):1601015. <https://doi.org/10.1002/mnfr.201601015>
- Huo R et al. 2015. Effects of Mediterranean-style diet on glycemic control, weight loss and cardiovascular risk

- factors among type 2 diabetes individuals: a meta-analysis. *Eur J Clin Nutr.* 69(11):1200–1208. <https://doi.org/10.1038/ejcn.2014.243>
- Hu FB, Drescher G, Trichopoulou A, Willett WC, Martínez-González MA. 2025. Three decades of the Mediterranean diet pyramid: a narrative review of its history, evolution, and advances. *Am J Clin Nutr.* 122(1):17–28. <https://doi.org/10.1016/j.ajcnut.2025.04.036>
- Iaccarino Idelson P, Scalfi L, Valerio G. 2017. Adherence to the Mediterranean Diet in children and adolescents: a systematic review. *Nutr Metab Cardiovasc Dis.* 27(4):283–299. <https://doi.org/10.1016/j.numecd.2017.01.002>
- Jayeddi A, Soltani S, Abdolshahi A, Shab-Bidar S. 2020. Healthy and unhealthy dietary patterns and the risk of chronic disease: an umbrella review of meta-analyses of prospective cohort studies. *Br J Nutr.* 124(11):1133–1144. <https://doi.org/10.1017/S0007114520002330>
- Jouanna J. 2016. Regimen in the hippocratic corpus: diaita and its problems. *Stud Anc Med.* 46:209–241. https://doi.org/10.1163/9789004307407_012
- Keys A et al. 1986. The diet and 15-year death rate in the seven countries study. *Am J Epidemiol.* 124(6):903–915. <https://doi.org/10.1093/oxfordjournals.aje.a114480>
- Keys A. 1997. Coronary heart disease in seven countries. *Nutrition.* 13(3):250–252; discussion 249, 253. [https://doi.org/10.1016/s0899-9007\(96\)00410-8](https://doi.org/10.1016/s0899-9007(96)00410-8)
- Koelman L, Egea Rodrigues C, Aleksandrova K. 2022. Effects of dietary patterns on biomarkers of inflammation and immune responses: a systematic review and meta-analysis of randomized controlled trials. *Adv Nutr.* 13(1):101–115. <https://doi.org/10.1093/advances/nmab086>
- Koloverou E, Esposito K, Giugliano D, Panagiotakos D. 2014. The effect of Mediterranean diet on the development of type 2 diabetes mellitus: a meta-analysis of 10 prospective studies and 136,846 participants. *Metabolism.* 63(7):903–911. <https://doi.org/10.1016/j.metabol.2014.04.010>
- Krznarić Ž, Karas I, Ljubas Kelečić D, Vranešić Bender D. 2021. The Mediterranean and Nordic Diet: a review of differences and similarities of two sustainable, health-promoting dietary patterns. *Front Nutr.* 8:683678. <https://doi.org/10.3389/fnut.2021.683678>
- Kucharczuk AJ, Oliver TL, Dowdell EB. 2022. Social media's influence on adolescents' food choices: a mixed studies systematic literature review. *Appetite.* 168:105765. <https://doi.org/10.1016/j.appet.2021.105765>
- Kulandaivelu Y et al. 2023. Social media interventions for nutrition education among adolescents: scoping review. *JMIR Pediatr Parent.* 6:e36132. <https://doi.org/10.2196/36132>
- Lăcătușu C-M, Grigorescu E-D, Floria M, Onofriescu A, Mihai B-M. 2019. The Mediterranean Diet: from an environment-driven food culture to an emerging medical prescription. *Int J Environ Res Public Health.* 16(6):942. <https://doi.org/10.3390/ijerph16060942>
- Lauria F et al. 2026. Mediterranean diet, gut microbiota, and type 2 diabetes: a systematic review and meta-analysis of intervention trials. *Nutr Metab Cardiovasc Dis.* 36(5):104433. <https://doi.org/10.1016/j.numecd.2025.104433>
- Lichtenstein AH et al. 2021. 2021 dietary guidance to improve cardiovascular health: a scientific statement from the american heart association. *Circulation.* 144(23):e472–e487. <https://doi.org/10.1161/CIR.0000000000001031>
- Liu Y et al. 2025. Interplay of genetic predisposition, plasma metabolome and Mediterranean diet in dementia risk and cognitive function. *Nat Med.* 31(11):3790–3800. <https://doi.org/10.1038/s41591-025-03891-5>
- Livingston G et al. 2024. Dementia prevention, intervention, and care: 2024 report of the Lancet standing Commission. *Lancet.* 404(10452):572–628. [https://doi.org/10.1016/S0140-6736\(24\)01296-0](https://doi.org/10.1016/S0140-6736(24)01296-0)
- Lorca-Camara V, Bosque-Prous M, Bes-Rastrollo M, O'Callaghan-Gordo C, Bach-Faig A. 2024. Environmental and health sustainability of the mediterranean diet: a systematic review. *Adv Nutr.* 15(12):100322. <https://doi.org/10.1016/j.advnut.2024.100322>
- Lotfi K, Saneei P, Hajhashemy Z, Esmailzadeh A. 2022. Adherence to the Mediterranean Diet, five-year weight change, and risk of overweight and obesity: a systematic review and dose-response meta-analysis of prospective cohort studies. *Adv Nutr.* 13(1):152–166. <https://doi.org/10.1093/advances/nmab092>
- Lotti S et al. 2024. Assessment of Mediterranean diet adherence and comparison with Italian dietary guidelines: a study of over 10,000 adults from 2019 to 2022. *Int J Food Sci Nutr.* 75(3):336–343. <https://doi.org/10.1080/09637486.2024.2313979>
- Maderuelo-Fernandez JA et al. 2015. Effectiveness of interventions applicable to primary health care settings to promote Mediterranean diet or healthy eating adherence in adults: a systematic review. *Prev Med.* 76(Suppl):S39–S55. <https://doi.org/10.1016/j.ypmed.2014.12.011>
- Marino P et al. 2024. Healthy lifestyle and cancer risk: modifiable risk factors to prevent cancer. *Nutrients.* 16(6):800. <https://doi.org/10.3390/nu16060800>
- Marshall NE et al. 2022. The importance of nutrition in pregnancy and lactation: lifelong consequences. *Am J Obstet Gynecol.* 226(5):607–632. <https://doi.org/10.1016/j.ajog.2021.12.035>
- Martínez-González MA et al. 2015. Benefits of the Mediterranean Diet: insights from the PREDIMED study. *Prog Cardiovasc Dis.* 58(1):50–60. <https://doi.org/10.1016/j.pcad.2015.04.003>
- Martínez-González MÁ, Hershey MS, Zazpe I, Trichopoulou A. 2017. Transferability of the Mediterranean Diet to non-mediterranean countries. What is and what is not the Mediterranean Diet. *Nutrients.* 9(11):1226. <https://doi.org/10.3390/nu9112226>
- Martínez-Lapiscina EH et al. 2013. Mediterranean diet improves cognition: the PREDIMED-NAVARRA randomised trial. *J Neurol Neurosurg Psychiatry.* 84(12):1318–1325. <https://doi.org/10.1136/jnnp-2012-304792>
- Martini D et al. 2021. Principles of sustainable healthy diets in worldwide dietary guidelines: efforts so far and future perspectives. *Nutrients.* 13(6):1827. <https://doi.org/10.3390/nu13061827>
- McCarthy CM, de Vries R, Mackenbach JD. 2022. The influence of unhealthy food and beverage marketing through social media and advergames on diet-related outcomes in children—a systematic review. *Obes Rev.* 23(6):e13441. <https://doi.org/10.1111/obr.13441>
- Mengi Çelik Ö, Güler Ü, Ekici EM, Aytekin Şahin G. 2025. Factors associated with ultra-processed foods consumption: cooking and food preparation skills and food lit-

- eracy. *BMC Public Health*. 25(1):3078. <https://doi.org/10.1186/s12889-025-23196-z>
- Michelsoni G et al. 2025. Sustainability of the Mediterranean Diet: a nutritional and environmental imperative. *J Sustain Res*. 7(2):e250036.
- Morze J et al. 2021. An updated systematic review and meta-analysis on adherence to Mediterranean diet and risk of cancer. *Eur J Nutr*. 60(3):1561–1586. <https://doi.org/10.1007/s00394-020-02346-6>
- Niebylski ML et al. 2014. Healthy food procurement policies and their impact. *Int J Environ Res Public Health*. 11(3):2608–2627. <https://doi.org/10.3390/ijerph110302608>
- Norris SA et al. 2022. Nutrition in adolescent growth and development. *Lancet*. 399(10320):172–184. [https://doi.org/10.1016/S0140-6736\(21\)01590-7](https://doi.org/10.1016/S0140-6736(21)01590-7)
- Obeid CA, Gubbels JS, Jaalouk D, Kremers SPJ, Oenema A. 2022. Adherence to the Mediterranean diet among adults in Mediterranean countries: a systematic literature review. *Eur J Nutr*. 61(7):3327–3344. <https://doi.org/10.1007/s00394-022-02885-0>
- Perrone P, Landriani L, Patalano R, Meccariello R, D'Angelo S. 2025. The Mediterranean Diet as a model of sustainability: evidence-based insights into health, environment, and culture. *Int J Environ Res Public Health*. 22(11):1658. <https://doi.org/10.3390/ijerph22111658>
- Petersson SD, Philippou E. 2016. Mediterranean diet, cognitive function, and dementia: a systematic review of the evidence. *Adv Nutr*. 7(5):889–904. <https://doi.org/10.3945/an.116.012138>
- Popkin BM, Ng SW. 2022. The nutrition transition to a stage of high obesity and noncommunicable disease prevalence dominated by ultra-processed foods is not inevitable. *Obes Rev*. 23(1):e13366. <https://doi.org/10.1111/obr.13366>
- Popkin BM. 2015. Nutrition transition and the global diabetes epidemic. *Curr Diab Rep*. 15(9):64. <https://doi.org/10.1007/s11892-015-0631-4>
- Poursalehi D, Lotfi K, Saneei P. 2023. Adherence to the Mediterranean diet and risk of frailty and pre-frailty in elderly adults: a systematic review and dose-response meta-analysis with GRADE assessment. *Ageing Res Rev*. 87:101903. <https://doi.org/10.1016/j.arr.2023.101903>
- Razavi AC et al. 2021. Effect of culinary education curriculum on Mediterranean diet adherence and food cost savings in families: a randomised controlled trial. *Public Health Nutr*. 24(8):2297–2303. <https://doi.org/10.1017/S1368980020002256>
- Reeves A, Loopstra R, Stuckler D. 2017. The growing disconnect between food prices and wages in Europe: cross-national analysis of food deprivation and welfare regimes in twenty-one EU countries, 2004–2012. *Public Health Nutr*. 20(8):1414–1422. <https://doi.org/10.1017/S1368980017000167>
- Rosi A et al. 2025. Children's and adolescents' lifestyle factors associated with physical activity in five Mediterranean countries: the DELICIOUS project. *Front Public Health*. 13:1654645. <https://doi.org/10.3389/fpubh.2025.1654645>
- Sam-Yellowe TY. 2024. Nutritional barriers to the adherence to the mediterranean diet in non-Mediterranean populations. *Foods*. 13(11):1750. <https://doi.org/10.3390/foods13111750>
- Šarac J et al. 2021. A generation shift in Mediterranean diet adherence and its association with biological markers and health in Dalmatia, Croatia. *Nutrients*. 13(12):4564. <https://doi.org/10.3390/nu13124564>
- Scazzina F et al. 2025. Socio-economic status, food security and adherence to the Mediterranean diet in five Mediterranean countries: the DELICIOUS project. *Int J Food Sci Nutr*. 76(8):869–877. <https://doi.org/10.1080/09637486.2025.2570363>
- Schwingshackl L, Bogensberger B, Hoffmann G. 2018. Diet quality as assessed by the healthy eating index, alternate healthy eating index, dietary approaches to stop hypertension score, and health outcomes: an updated systematic review and meta-analysis of cohort studies. *J Acad Nutr Diet*. 118(1):74–100.e11. <https://doi.org/10.1016/j.jand.2017.08.024>
- Schwingshackl L, Missbach B, König J, Hoffmann G. 2015. Adherence to a Mediterranean diet and risk of diabetes: a systematic review and meta-analysis. *Public Health Nutr*. 18(7):1292–1299. <https://doi.org/10.1017/S1368980014001542>
- Schwingshackl L, Morze J, Hoffmann G. 2020. Mediterranean diet and health status: active ingredients and pharmacological mechanisms. *Br J Pharmacol*. 177(6):1241–1257. <https://doi.org/10.1111/bph.14778>
- Schwingshackl L, Schwedhelm C, Galbete C, Hoffmann G. 2017. Adherence to Mediterranean Diet and risk of cancer: an updated systematic review and meta-analysis. *Nutrients*. 9(10):1063. <https://doi.org/10.3390/nu9101063>
- Sebastian SA, Padda I, Johal G. 2024. Long-term impact of Mediterranean Diet on cardiovascular disease prevention: a systematic review and meta-analysis of randomized controlled trials. *Curr Probl Cardiol*. 49(5):102509. <https://doi.org/10.1016/j.cpcardiol.2024.102509>
- Serra-Majem L et al. 2020. Updating the Mediterranean Diet pyramid towards sustainability: focus on environmental concerns. *Int J Environ Res Public Health*. 17(23):8758. <https://doi.org/10.3390/ijerph17238758>
- Shannon OM et al. 2023. Mediterranean diet adherence is associated with lower dementia risk, independent of genetic predisposition: findings from the UK Biobank prospective cohort study. *BMC Med*. 21(1):81. <https://doi.org/10.1186/s12916-023-02772-3>
- Shan Z et al. 2023. Healthy eating patterns and risk of total and cause-specific mortality. *JAMA Intern Med*. 183(2):142–153. <https://doi.org/10.1001/jamainternmed.2022.6117>
- Sina E, Boakye D, Christianson L, Ahrens W, Hebestreit A. 2022. Social media and children's and adolescents' diets: a systematic review of the underlying social and physiological mechanisms. *Adv Nutr*. 13(3):913–937. <https://doi.org/10.1093/advances/nmac018>
- Sinai T, Axelrod R, Shimony T, Boaz M, Kaufman-Shriqui V. 2021. Dietary patterns among adolescents are associated with growth, socioeconomic features, and health-related behaviors. *Foods*. 10(12):3054. <https://doi.org/10.3390/foods10123054>
- Skiadas PK, Lascaratos JG. 2001. Dietetics in ancient Greek philosophy: Plato's concepts of healthy diet. *Eur J Clin Nutr*. 55(7):532–537. <https://doi.org/10.1038/sj.ejcn.1601179>

- Sofi F, Cesari F, Abbate R, Gensini GF, Casini A. 2008. Adherence to Mediterranean diet and health status: meta-analysis. *BMJ*. 337(sep11 2):a1344–a1344. <https://doi.org/10.1136/bmj.a1344>
- Sproesser G et al. 2019. Understanding traditional and modern eating: the TEP10 framework. *BMC Public Health*. 19(1):1606. <https://doi.org/10.1186/s12889-019-7844-4>
- Tessier A-J et al. 2025. Optimal dietary patterns for healthy aging. *Nat Med*. 31(5):1644–1652. <https://doi.org/10.1038/s41591-025-03570-5>
- Tharrey M et al. 2020. Industrially processed v. home-prepared dishes: what economic benefit for the consumer? *Public Health Nutr*. 23(11):1982–1990. <https://doi.org/10.1017/S1368980019005081>
- Tognon G et al. 2014. Mediterranean diet, overweight and body composition in children from eight European countries: cross-sectional and prospective results from the IDEFICS study. *Nutr Metab Cardiovasc Dis*. 24(2):205–213. <https://doi.org/10.1016/j.numecd.2013.04.013>
- Trajkovska Petkoska A, Ognenoska V, Trajkovska-Broach A. 2025. Mediterranean diet: from ancient traditions to modern science—a sustainable way towards better health, wellness, longevity, and personalized nutrition. *Sustainability*. 17(9):4187. <https://doi.org/10.3390/su17094187>
- Trichopoulou A, Costacou T, Bamia C, Trichopoulos D. 2003. Adherence to a Mediterranean diet and survival in a Greek population. *N Engl J Med*. 348(26):2599–2608. <https://doi.org/10.1056/NEJMoa025039>
- Trichopoulou A, Lagiou P. 1997. Healthy traditional Mediterranean diet: an expression of culture, history, and lifestyle. *Nutr Rev*. 55(11 Pt 1):383–389. <https://doi.org/10.1111/j.1753-4887.1997.tb01578.x>
- Trichopoulou A. 2021. Mediterranean diet as intangible heritage of humanity: 10 years on. *Nutr Metab Cardiovasc Dis*. 31(7):1943–1948. <https://doi.org/10.1016/j.numecd.2021.04.011>
- Trichopoulou A. 2022. Olive oil, Greek Mediterranean diet heritage and honoring the past to secure our future: priorities for research and education. *Front Nutr*. 9:1058402. <https://doi.org/10.3389/fnut.2022.1058402>
- Trolle E et al. 2024. Integrating environmental sustainability into food-based dietary guidelines in the Nordic countries. *Food Nutr. Res*. 68:10.29219.
- Tsofliou F, Vlachos D, Hughes C, Appleton KM. 2022. Barriers and facilitators associated with the adoption of and adherence to a mediterranean style diet in adults: a systematic review of published observational and qualitative studies. *Nutrients*. 14(20):4314. <https://doi.org/10.3390/nu14204314>
- Uylaşer V, Yildiz G. 2014. The historical development and nutritional importance of olive and olive oil constituted an important part of the Mediterranean diet. *Crit Rev Food Sci Nutr*. 54(8):1092–1101. <https://doi.org/10.1080/10408398.2011.626874>
- Valls-Pedret C et al. 2015. Mediterranean diet and age-related cognitive decline: a randomized clinical trial. *JAMA Intern Med*. 175(7):1094–1103. <https://doi.org/10.1001/jamainternmed.2015.1668>
- Vareiro D et al. 2009. Availability of Mediterranean and non-Mediterranean foods during the last four decades: comparison of several geographical areas. *Public Health Nutr*. 12(9A):1667–1675. <https://doi.org/10.1017/S136898000999053X>
- Vepsäläinen H, Lindström J. 2024. Dietary patterns - a scoping review for Nordic Nutrition Recommendations 2023. *Food Nutr. Res*. 68:10541.
- Vitale M, Giosuè A, Vaccaro O, Riccardi G. 2021. Recent trends in dietary habits of the Italian population: potential impact on health and the environment. *Nutrients*. 13(2):476. <https://doi.org/10.3390/nu13020476>
- Vithayathil S et al. 2025. Navigating evidence on ultra-processed foods and cancer: a narrative review. *Cureus*. 17(11):e96173. <https://doi.org/10.7759/cureus.96173>
- Wallerer S et al. 2025. Adherence to Mediterranean Diet and risk of type 2 diabetes: an updated systematic review and dose-response meta-analysis. *Adv Nutr*. 16(12):100562. <https://doi.org/10.1016/j.advnut.2025.100562>
- Waterlow JC. 1989. Diet of the classical period of Greece and Rome. *Eur J Clin Nutr*. 43 Suppl 2:3–12.
- Wilkins J. 2015. Good food and bad: nutritional and pleasurable eating in ancient Greece. *J Ethnopharmacol*. 167:7–10. <https://doi.org/10.1016/j.jep.2014.12.016>
- Wilkins J. 2023. Food for life: Galen's "on health" ("De sanitate tuenda"). *SC*. 13:153–164.
- Willett WC et al. 1995. Mediterranean diet pyramid: a cultural model for healthy eating. *Am J Clin Nutr*. 61(6 Suppl):1402S–1406S. <https://doi.org/10.1093/ajcn/61.6.1402S>
- Yesildemir O et al. 2025. Adherence to the Mediterranean Diet among families from four countries in the Mediterranean Basin. *Nutrients*. 17(7):1157. <https://doi.org/10.3390/nu17071157>
- Yubero-Serrano EM et al. 2020. Mediterranean diet and endothelial function in patients with coronary heart disease: an analysis of the CORDIOPREV randomized controlled trial. *PLoS Med*. 17(9):e1003282. <https://doi.org/10.1371/journal.pmed.1003282>