

# The New Modern Mediterranean Diet Italian Pyramid

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## Abstract

**Background.** Epidemiological studies have established the health benefits associated with the adherence to the MD (Mediterranean Diet), mainly in relation to reducing the risk of developing the non communicable diseases. The MD is a sustainable diet model that respects the environment, promotes the bio-diversity, the local cultural heritages, the social interaction and economic aspects.

**Methods.** The pyramid is a graphical representation designed to represent the frequencies of consumption and portion sizes of each food according to the Mediterranean model and tradition. The pyramid was developed taking into account the LARN (Reference Intake of nutrients and energy for Italian Population) and the Italian Guidelines for a healthy diet.

**Results.** The frequency of consumption and the portion size recommended are located at the different level of the pyramid. At the base of the pyramid there are the foods that should be consumed every meal and some concepts typical of the Mediterranean culture. In the middle there are foods that should be consumed daily and at the top of the pyramid the foods consumed on a weekly basis.

**Conclusions.** The new modern MD Italian Pyramid is an important tool to promote the MD and improve the adherence to the MD dietary pattern

## Introduction

Since the first studies in 1970s (Seven Countries Studies), the Mediterranean Diet (MD) has been recognized as a dietary pattern associated with decreased all-cause mortality and reduction in the cardiovascular risk factors level. (1).

Further recent epidemiological studies have established the health benefits associated with the adherence to the MD, mainly in relation to reducing the risk of developing non communicable diseases such as type 2 diabetes, cardiovascular diseases, some

neurodegenerative diseases and cancers (2-5).

The MD includes the following dietary factors: a high intake of plant foods comprising mainly fruit and vegetables, cereals and whole grain breads, pulses, nuts and seeds; olive oil as a main source of fat; a moderate amounts of cheese and yogurt; low quantities of red meat and a moderate quantities of fish; a moderate amount of red wine accompanying main meals. The MD is characterized by a high intake b-carotene, group B, C and E vitamins, folic acid, polyphenols and other phytochemicals (6, 7).

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The MD is not only a dietary model but constitutes a set of skills, knowledge, practices and traditions ranging from the landscape to the table, including the crops, harvesting, fishing, conservation, processing, preparation of food, that the peoples of the Mediterranean basin, and among them the Italians, have always recognized as an integral part of their cultural heritage (8).

Moreover, it is considered a sustainable diet model that respects the environment, promotes the bio-diversity, the local cultural heritages, the social interaction and economic aspects (9-11). The Mediterranean dietary pattern since 1995 has been popularised using the graphical representation of the pyramid. After the recognition of the MD as an Intangible Cultural Heritage of Humanity by UNESCO in 2010 (12), considering the worldwide interest in the MD and taking as a framework all the mentioned aspects, scientists present a consensual renewed communication tool for the general public, health professional and stakeholders (13).

In the 2009, during the third CIISCAM (International University Centre of Studies on Mediterranean Food Cultures) Conference, held in Parma, a consensus position on a new revised Mediterranean Diet Pyramid was defined, moving from the current concept of the MD as just a model of healthy eating, that reduces mortality and morbidity, to an updated well-being lifestyle concept of the MD.

The aim of the present work is to develop a new pyramid based on the MD model in order to promote a greater adherence to MD, a healthy and balanced dietary pattern.

## Methods

The pyramid is a graphical illustration designed to represent the frequencies of consumption and portion sizes of each food

Table 1 - Energy and nutrient used to develop the Pyramid

Main Component	Unit
Energy	2,000 kcal
Carbohydrates	55-60% of energy
Sugars	< 15% of energy
Proteins	15-16% of energy (prevalence of vegetable origin)
Lipids	30 % of energy
Fibre	25 g/die
Calcium	1,000 mg/die
Iron	18 mg/die
Cholesterol	< 300 mg/die

group according to the Mediterranean model and tradition.

The new Mediterranean Diet Italian Pyramid considers the evolution of the times and society and is addressed to a population aged between 18 and 65 years.

The pyramid was developed taking into account the LARN (Reference Intake of nutrients and energy for Italian Population) for the requirements of nutrients (macronutrients and micronutrients) and energy (14) and the Italian Guidelines for a healthy diet for the daily energy intake of 2000 kcal, which corresponds to the average requirement of an adult in good health (15).

Table 1 shows the main components provided to develop the pyramid (table 1).

The new pyramid encompasses not only nutritional aspects but also physical activities, socio-cultural and environmental aspects.

## Results

In the New Modern MD Italian pyramid (Figure 1), starting from the base, some concepts typical of the Mediterranean culture were introduced, such as traditions, conviviality, frugality, sustainability, seasonality and territoriality.

Table 2 - Portions and frequency of consumption of The New Modern Mediterranean Diet Italian Pyramid

Food	<i>Every meal</i>	
	Portion (g=grams) (L = litres) (mL = millilitres) (m= minutes)	Frequency (p= portion)
Fruit	150 g	1-2 p
Vegetable	200 g (cooked or raw) 80 g (salad)	1-2 p
Cereals (Pasta, rice, spelt, couscous and others)	80 g 40 g with pulses or soup	2 p
Bread	50 g	
<i>Every day</i>		
Milk or yogurt	125 g	2 p
Breakfast Products (cookies, biscuits, breakfast cereals)	40 g	1 p
Extra virgin olive oil (EVO)	10 g	2-3 p
Physical activity	30 m	Every day
Water and herbal infusion	1.5-2 L	8-10 p
Wine (during the meal)	125 mL	1 p for women 2 p for men
<i>Weekly</i>		
Potatoes	200 g	1-2 p
Pulses	50 g (dry) 150 g (fresh)	2-3 p
Meat	100 g (red) 100 g (poultry)	1 p 1-2 p
Fish	150 g	2-3 p
Egg	50 g	2 p
Processed meat	50 g	1-2 p
Diary Product	50 g (matured cheese) 100 g (soft cheese)	2 p
Dried fruit	15 g	3 p
Sweets	100 g	1 p

Suggested frequency of consumption and portion sizes of the pyramid are shown in Table 2.

At the base of the pyramid are the foods that should be consumed every meal:

- Vegetables and fruit (1-2 portions of

vegetables and 1-2 portions of fruit for up to 3 portions per day).

- Cereals (2-3 portions of bread, pasta, rice, cous-cous, spelt and the others) In the middle of the pyramid there are foods that should be consumed daily.

Milk and yogurt (2 portions).

Breakfast products: cookies, biscuits, breakfast cereals, etc. (1 portion).

Olive oil (2-3 portions), extra virgin olive oil, which should be the main source of dietary lipids.

Herbs and spices to flavour dishes.

Foods to be consumed on a weekly base are situated on top of the pyramid

The weekly consumption of food of animal origin (meat, processed meat, fish, eggs, cheese) is recommended to be alternated with pulses (2-3 portions size), preferably in combination with cereals. Also the consumption of potatoes is recommended weekly (1-2 portions), and it is also recommended to consume 3 portions of dried fruit weekly. At the last step of the pyramid the sweets are located that should be eaten only occasionally (1 portion per week). The wine, a typical beverage of the Mediterranean tradition, should be consumed with moderation and preferably during meals (1 glass per day for women and two glasses per day for men). Every day 1.5-2 litres of water should be guaranteed also in form of the herbal infusions. In according to the

Mediterranean model the pyramid takes into account the physical activity. At least a 30 minutes per day are recommended, as suggested by WHO (14).

### Discussion

The New Modern Mediterranean Diet Italian Pyramid has been developed on the principles common to the Mediterranean Countries but at the same time it is related to typical foods of the specific country, taking into account the geographical and socio-cultural situations and the changes in food consumption pointed out by several epidemiological studies (13, 17).

The New Modern Mediterranean Diet Italian Pyramid promotes the Mediterranean Model, one of the healthiest Dietary Patterns (6). The pyramid includes all foods. Plant-based foods are situated at the base of the pyramid. Fruit and vegetables provide water, micronutrients and fiber, but also antioxidants that help to maintain a good state of health. There is a general consensus that an intake of both fruit and vegetables is



Figure 1 - The New Modern Mediterranean Diet Italian Pyramid

more important in providing health benefits that only one of them, due to an additive and synergistic effects (18).

In addition, in the choice of vegetables and fruit, it is important to alternate the species and varieties according to their colour. Each colour, in fact, corresponds to a particular pool of antioxidants that have beneficial effects on health (19).

Much of their potential for disease prevention is thought to be provided by phytochemicals, among which the preventive activity of antioxidants is most well-documented (18).

The fiber (25 g per day) is essential not only for a regular bowel function and satiety, but also to modulate the absorption of nutrients (glucose and cholesterol) (20). In the pyramid the energy intake is provided largely by the cereals and their derivatives, due to their content of starch and protein. The pulses, in combination with cereals, dishes typical of the Mediterranean tradition, is a good source of starch and proteins of vegetable origin, therefore excellent source from the nutritional standpoint and for the complementarity of nutrients. Olive oil, a key element of the MD, is located in the middle of the pyramid. It's the main source of the dietary lipids for the content of the monounsaturated fatty acid. Recent epidemiological research has shown that regular consumption of olive oil is associated with increased longevity. Moreover there is converging evidence on the benefits of olive oil for preventing several CVD risk factors, including diabetes, and obesity. Olive oil is also implicated in preventing certain cancers, with the most promising findings for breast and digestive tract cancers (21). Still in the centre of the pyramid are located milk and yogurt. The greatest amount of dietary calcium is obtained from milk and dairy foods, which also provide the vitamin D, potassium, and other macro- and micronutrients intake. The role of calcium intake in determining bone

mineral mass is well recognized to be the most critical nutritional factor to achieve optimal peak bone mass (22). Other animal origin foods (meat, fish, egg, processed meat and dairy products) are located at the top of the pyramid, they should be consumed with moderation alternating them during the week. These foods provide a good amount of animal protein, high-quality protein, but also lipids. The lipid contents in the fish are mainly polyunsaturated fatty acids, in particular the long chain n-3 PUFA that reduce the risk of CHD and have anti-inflammatory properties (23). At the last step of the pyramid are the sweets (sugar, cakes, pastries, etc), that should be consumed, one portion of 100 g per week. Sweets provide a high energy intake, sugar and lipids (24). The physical activity recommended is at least 30 minutes per day. Physical activity does not only include sports such as soccer, dancing, cycling etc. but also daily practice of walking, climbing stairs, housework, gardening or leisure activities outdoors (16). Therefore, the low energy density, the variety, and the importance of physical activity, typical of the Mediterranean model, are the key elements in the prevention of food-related diseases and the maintenance of health status. Besides, the variety is essential not only to reduce the risk of developing nutritional deficiencies and to assume anti-nutritional factors but also to avoid the monotony of the diet (15). The current perception of the MD is focused principally on its functional health benefit, related to the consumption of a balanced quantity of different foods, but the Mediterranean lifestyle include not only dietary factor but also socio-cultural and environmental aspects located at the base of the pyramid. Socio-cultural aspects, in particular the tradition, are pivotal in the Mediterranean pyramid. Traditions are a mix of knowledge and practices developed over the time and transferred through the generations, including agricultural

production practices (crop and livestock) and all the techniques of food preparation and consumption (12). The identification of the symbolic value of food has led to the creation of strong links between local foods, local heritage and identity. From an environmental and economic point of view, production of typical foods of the MD occurs in a sustainable way, contributing to rural development and the preservation of biodiversity (25). Consumption of fresh and local products, in terms of seasonality, biodiversity, traditional culinary activities, as well as the variety of foods (especially in terms of different colours of fruit and vegetables), represents the cornerstone of the Mediterranean dietary pattern (26). Italy is a country located at an intermediate latitude between the pole and the equator in a temperate zone. The climatic conditions, regulating the vegetative cycle of plants, greatly affect the agricultural production of a region. The consumption of fruit and vegetables, therefore, should take place when their ripening occurs in a natural way. In addition, consuming products out of their ripening season generates a greater environmental impact due to the technologies used for the cultivation in greenhouses, the conservation and the shipping worldwide (27). The sustainability characterizes the pyramid of MD. The MD is as an example of sustainable diet, with low environmental impact which contributes to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable, nutritionally adequate, safe and healthy while optimizing natural and human resources (28). An Italian study has shown that the MD is a sustainable model. The MD has a lower environmental and economic impact respect the current Italian food consumption (29). The social aspects encompass also conviviality and frugality.

The first is the time spent for the meal consumption shared with family or friends, which is crucial to generate or enhance social communication and community identity. The pleasure of food associated with the conviviality can positively influence eating behaviour (30). Frugality means moderation in the consumption of food portions. Foods represented at the base of the pyramid should be consumed in greater quantities and with greater frequency, because they induce satiety with a moderate energy intake, while foods on the top should be eaten in smaller portions and with lower frequency because they have a high energy, fats and simple sugars (13).

## Conclusions

In the last decades a change of lifestyle occurred. Westernization of traditional eating habits is characterized, as broadly defined, by high intake of refined carbohydrates, added sugars, fats, and animal-source foods. The change of how we eat and drink and energy imbalance has generated overweight and obesity, and the vast array of other nutrition-related cardio-metabolic diseases (31). The Italian National Food Consumption Survey INRAN-SCAI 2005-06 confirms this trend for the Italian population (32), showing a low adherence to the MD.

The New Modern Mediterranean Diet Italian Pyramid is an important tool to promote the MD and improve the adherence to the MD dietary pattern. The Pyramid should be used in the food education campaigns to produce a tangible impact in term of adherence to MD and in this way to contribute to the prevention of non-communicable diseases.

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## Riassunto

### *La Nuova Moderna Piramide Italiana della Dieta Mediterranea*

**Introduzione.** Numerosi studi epidemiologici hanno dimostrato che l'aderenza alla Dieta Mediterranea (DM) riduce il rischio di sviluppare patologie legate all'alimentazione. La DM è una dieta sostenibile dal punto di vista ambientale ed economico, inoltre, promuove la biodiversità, la convivialità e preserva le tradizioni locali.

**Metodi.** È stata sviluppata una Piramide, rappresentazione grafica, che consente di avere una immediata visione delle frequenze di consumo e delle porzioni di ciascun gruppo alimentare o alimento nel rispetto del Modello Mediterraneo. La Piramide è stata costruita usando come riferimento i Livelli di Assunzione di Riferimento di Nutrienti ed energia per la popolazione italiana (LARN) e le Linee Guida per una sana alimentazione italiana.

**Risultati.** Le frequenze di consumo e le porzioni suggerite sono collocate nei differenti livelli della Piramide. Alla base della Piramide ci sono gli alimenti che dovrebbero essere consumati ad ogni pasto. Alla base si trovano anche gli aspetti sociali, culturali e ambientali delle DM. Al centro della Piramide sono posizionati gli alimentari che dovrebbero essere consumati quotidianamente, salendo verso il vertice invece si trovano alimenti che vengono consumati su base settimanale.

**Conclusioni.** La nuova Piramide Moderna della DM è un importante strumento per promuovere la DM e migliorare l'aderenza al Modello Mediterraneo.

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