



## Mediterranean Diet in Prevention of Chronic Diseases

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### ABSTRACT

*Bad eating habits lead to the emergence of chronic health problems such as coronary artery diseases, hypertension, dyslipidaemia, cancer and obesity and the relationship between diet and diseases is emphasized and the relationship between them is clearly revealed in studies conducted over many years. The Mediterranean diet, which is first described by Angel Keys at the beginning of the 1960's, is not a specific diet but a natural way of eating in olive-growing region. With the properties such as the use of vegetable oils such as olive oil in particular, and the consumption of fish instead of red meat, the diet constitutes a health-protective nutrition. So, this review conducted the relationship between Mediterranean diet and chronic diseases.*

**Keywords:** Mediterranean diet, Diet, Chronic diseases, Nutrients

### INTRODUCTION

In studies conducted over many years, the relationship between diet and diseases is emphasized and the relationship between them is clearly revealed and it is emphasized that diet plays an important role in preventing chronic diseases [1-4]. Bad eating habits lead to the emergence of chronic health problems such as coronary artery diseases, hypertension, dyslipidaemia, cancer, and obesity [5]. The Mediterranean diet, which is first described by Angel Keys at the beginning of the 1960's, is not a specific diet but a natural way of eating in olive-growing regions such as Mediterranean Islands, Southern Italy, and some parts of Greece. The consumption of vegetables and whole grain foods is the basis of the diet that stands out in terms of its nutritional diversity [5-8]. With the properties such as the use of vegetable oils such as olive oil in particular, and the consumption of fish instead of red meat, the diet constitutes a health-protective nutrition [7]. In order to prevent chronic diseases and obesity, it is necessary to limit consumption of nutrients with high content of saturated fat and simple sugar, and to increase the consumption of whole grain products and vegetable/fruit as in Mediterranean diet [2].

#### Nutrients in Mediterranean diet

In order to prevent and control chronic diseases, it is recommended to consume the Mediterranean diet nutrients daily, weekly and monthly as indicated in Mediterranean dietary pyramid (Figure 1). The nutrients in the Mediterranean diet are presented below.

**Whole grain nutrients:** They are content rich in terms of vitamins, minerals, polyphenols, phytosterols and many phytochemicals. Cereals, an important source of dietary fibres, play an important role in reducing the risk of developing obesity and chronic diseases such as coronary heart disease, cancer, type 2 diabetes. The consumption of whole grain foods with low glycaemic indexes provides the regulation of blood glucose level and thus protects cardiovascular health by protecting the health of the veins [2,9-12].

**Vegetables and fruits:** They are composed of lutein, folic acid, beta carotene, and vitamins E, C, K, B2 and B6, in addition to compounds of pulp, magnesium, potassium, and components with similar antioxidant properties. The high antioxidant properties of polyphenols in their contents reduce the harmful effects of reactive oxygen and free radicals, prevent insulin resistance, prevent cessation of cell proliferation and prevent inflammation. Thus, they protect individuals against diseases such as cardiovascular diseases, cancer, hypertension, type 2 diabetes, and

obesity. In addition, vegetables and fruits prevent atherosclerosis by significantly increasing serum antioxidant levels and inhibiting lipid peroxidation [2,11,12].

**Legumes:** It contains plenty of zinc, phosphorus, magnesium, iron, and calcium. They are the primary source of pulp, and by the low-fat content, it has important place in the diet of diseases like cardiovascular diseases and diabetes. Legumes reduce the risk of development of chronic diseases such as myocardial infarction, type 2 diabetes, cardiovascular diseases, and metabolic syndrome by decreasing serum total cholesterol, LDL cholesterol level, by regulating blood glucose level and by decreasing systolic blood pressure [2,9,11,12].

**Fatty seeds:** With the composition of unsaturated fat, resveratrol, phytosterols, flavonoid and vitamin E, reduce total and LDL cholesterol levels, they reduce oxidative stress and inflammation, thus decrease the risk of developing cardiovascular diseases and prevent cancer [2,9,11,12].

**Olive oil:** The basis of the energy taken from the fats being derived from olive oil is the important characteristic of the diet. Olive oil is rich in oleic acid, which is a monounsaturated fatty acid. It is stated that these acids protect against hypertension and atherosclerosis and reduce cardiovascular mortality. Phenolic compounds present in their contents prevent the accumulation of platelets and at the same time have anti-inflammatory effects [2,11].

**Fish:** Rich in minerals such as iron, copper, phosphorus, selenium, calcium and iodine and vitamins A, B, and D. They are composed of high amounts of  $\alpha$ -linoleic acid (omega 3) and very long chain polyunsaturated fat. The content of n-3 fatty acids have in anti-lipidemic, antiplatelet, anti-inflammatory, and antiarrhythmic effects, by this way fish has the role of protection of cardiovascular health. They are protective against sudden deaths from arrhythmia, diabetes, hypertension, and stroke [2,11,12].

**Red wine:** is composed of polyphenol, quercetin, resveratrol. It has been reported that moderate and regular consumption has contributed to the reduction of hypertension, type 2 diabetes, some types of cancer and cardiovascular diseases [2].

The health effects of the nutrients of the Mediterranean diet, detailed above, are summarized in Table 1.

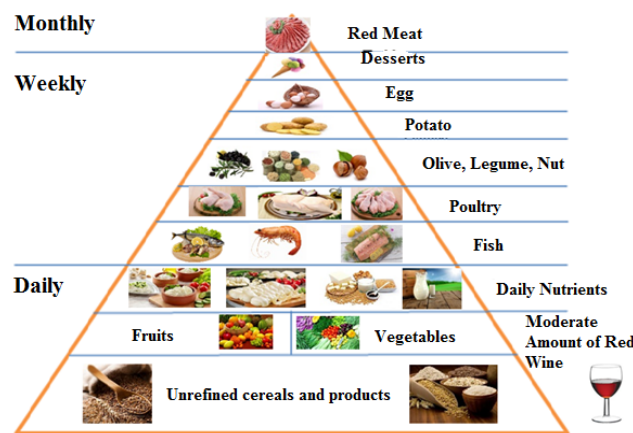


Figure 1 Mediterranean diet pyramid (Inspired by Panagiotakos DB, et al. [12], created by the author).

**Mediterranean diet and relation with chronic diseases**

Mediterranean type nutrition has been introduced as a model for healthier nutrition throughout the world. The highest intake of polyunsaturated fatty acids, antioxidant vitamins and other nutrients that are useful for the prevention of chronic conditions has been associated with better quality of life and better health status [8]. A review of the literature suggests that Mediterranean diet may be associated with decreased risk of breast cancer, type 2 diabetes and cardiovascular events in a systematic review and meta-analysis that assesses the impact of the Mediterranean diet on health outcomes without restriction of fat intake [13]. In another randomized controlled study, it was reported that 43% of the risk of retinopathy was statistically significantly reduced in the Mediterranean diet group supplemented with extra virgin olive oil after an average of 6 years of follow-up, while the risk of retinopathy was reduced by 38% in the Mediterranean diets supplemented with hard-shelled nuts, though not statistically significant [14]. A study examining the association of a Mediterranean diet with a decrease in the risk of heart failure in men has also been reported to be

associated with a decrease in the risk of heart failure in men with high dependency to the diet [15]. In another study that examined the effect of Mediterranean Diet intervention on plasma acyl-carnitines and cardiovascular disease risk, it has been shown that intervention may alleviate the inverse relationship between high acyl-carnitine concentrations and cardiovascular disease [16]. The relationship between cardiometabolic risk factors and 5 dietary quality scores was assessed by 2-year follow-up in adults aged 45-75 years, and it was reported that Mediterranean diet food and dietary quality scores were strongly associated with better cardiometabolic profile after 2 years of follow-up [17]. In the study conducted by Stefler, et al. [18] to examine Mediterranean diet score and total and cardiovascular mortality rates in Eastern Europe, it was stated that the incidence of cardiovascular disease-related deaths and total deaths in urban populations decrease with increasing Mediterranean diet compliance [18].

**Table 1 Nutrient contents and health effect of Mediterranean diet**

Contents	Nutrient Source	Mechanism	Health Effect	
Polyphenols [1-3]	Vegetables and Fruits	Antioxidant effect Inflammation-reducing effect	Protective against type 2 diabetes	
	Olive oil		Protective against cardiovascular diseases	
	Red wine		Reduced risk of lung cancer	
Flavonoids [3,11]	Fatty seeds	Antiproliferative	Prevention of breast cancer	
	Red wine	Antioxidant		
Phytosterols [1,2]	Soy bean	Reduces serum cholesterol levels	Reduced risk of vascular diseases	
	Vegetables	Reduction of oxidative stress and inflammation	Prevention of obesity	
n-3 fatty acids (alpha linoleic acid) [1-3]	Fish	Antiangiogenesis	Prevention of strokes	
	Flaxseed	Reduction of oxidative stress	Protection of cardiovascular health	
	Soya oil	Reduction of thrombocyte aggregation		
	Walnut	Green leafy vegetables	Antilipidemic	Prevention of sudden deaths
			Antiplatelet	
		Anti-inflammatory Anti-arrhythmic	Reduced risk of colon and rectal cancer	
Resveratrol [2,3]	Red wine	Suppresses prostaglandin E2 synthesis	Reduced risk of breast cancer	
		Inhibits TNFa		
		Inhibits CoX2 synthesis		
	Fatty seeds	Reduction of thrombocyte aggregation	Protective for cardiovascular system	
Reduces serum cholesterol levels				
Quercetin [3]	Grape	Vasodilatation	Anticoagulation	
		Red wine	Antiaggregant effect	Reduced risk of hypertension formation
Oleic acid [2,3]	Olive oil	Inhibits HER2 which takes a role in the aetiology of metastasis	Antihypertensive effect	
		Protective against atherosclerosis	Reduced risk of cardiovascular diseases	
			Reduced risk of breast cancer	
Carotenoids [3]	Yellow, red and orange fruits	Antioxidant	Reduced risk of lung cancer	
	Vegetables			
	Tomato			
Lutein [1,13]	Green vegetables	Antioxidant	Reduced risk of diabetes	
	Whole grains		Reduced risk of cancer	

**CONCLUSION**

To summarize, the protective effect of the Mediterranean diet on chronic diseases is provided by antioxidants, anti-inflammatory agents and bioactive components found in the nutrient contents. The diet has a protective effect against obesity due to the pulp increasing the period of chewing, enhancing, and increasing satiety, delaying the period of

ejaculation, and increasing the secretion of cholecystokinin. These effects also reduce the risk of developing chronic diseases caused by obesity [2].

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