

# Mediterranean Diet Trial on Prevention of Chronic Cardiovascular Diseases: A descriptive preliminary study.\*

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## Introduction

In 2016 a decision was taken by the Executive Board of the Mediterranean League of Angiology and Vascular Surgery to monitor an open study on Med-Diet (Med-D) in order to analyze the effects of this diet on the basis of a protocol and a well-balanced questionnaire of 22 pages; this study has started to enroll subjects in January 2017 taking into account the MED-D Score described by UNESCO in 2013, as well as other, already validated statistic guidelines.

Two years ago (2018) the results of a pilot study from the Republic of Cyprus were presented at the 28th MLAVS Congress in Palermo on 138 volunteers with a range of age between 20 and 80 years using the MLAVS questionnaire. The aim of the pilot study was to validate the MLAVS questionnaire, to see its flexibility in practice and to analyze the preliminary results on a unique Mediterranean population living in a single Mediterranean Country.

This pilot study also described the different foods and beverages that act in combination contributing to an overall improvement of health status. The pilot study suggested that the most popular Med-D ingredient is olive oil (Tables 1 and 2)

**Table 1: Type of oil used in fresh salads and cooked legumes**

Selection	%
Olive oil	98.3%
Other plant oils	0.9%
Other animal oils	0.8%

**Table 2: Type of oil used for cooking**

Selection	%
Olive oil	62.3%
Other plant oils	29.0%
Other animal oils	18.7%

**The pilot study also suggested that fruits and vegetables were on the top of the list**



**Table 3: Distribution of fruits within every-day meals**

Yes	%
Breakfast	14.9%
Lunch	92.2%
Afternoon	79.7%
Evening meal	91.4%

## A second, more advanced, attempt on Med-D study

To-day, an expanded but still preliminary study on Med-D is presented. This study has been carried out using the same protocol in six Mediterranean Countries (Cyprus, Egypt, Greece, Italy, France and Slovenia). Five hundred volunteers were enrolled in the study (Cyprus n=150, Egypt n=50, Italy n=200, France n=50, Slovenia n=50). The percentage of men was 51.5% and of women 48.5% (Table 4).

## Results

The study was reviewed and approved by the Cyprus Bioethics Committee (CBC). The sample was selected randomly through the use of a telephone directory. All participants were selected on a purely voluntary basis. Their gender is shown in Table 4 and their age in Table 5. According to the results, adult population has an accurate perception of their weight situation as 26.7% considered themselves to be above the normal weight and 59.7% at the normal weight (Table 6). The correlation between BMI and hypertension as well as the medical history -at least its major parameters- is shown in Tables 7 and 8 respectively.

**Table 4: Gender (n=500)**

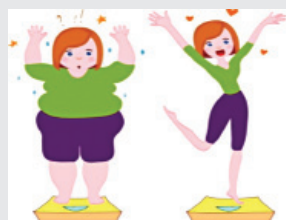




**Table 5: Distribution of age (n=500)**

Years	%
20-24	12,1
25-29	11,3
30-34	10,9
35-39	11,8
40-44	12,0
45-49	10,5
50-54	10,0
55-59	8,2
60-64	7,1
65+	6,0

**Table 6: Distribution of Body Weight (n=500)**

- Normal 59.7%
- Below normal 13.6%
- Above normal 17.0%
- Very fat 9.7%

**Table 7: Mean values and SD of major parameters studied**

• Body weight (Kg)	68.7 +/- 14.5
• Height (m) cm	1.67 +/- 0.8
• Abdominal Circumference 	60.7 +/- 10.6
• Abdominal Circumference 	79.8 +/- 14.5
• Blood pressure (Systolic)	114.8 +/- 20.8
• Blood pressure (diastolic)	74.3 +/- 16.2
• BMI	22.5 +/- 4.2

**Table 8: Medical history**

• Hypertension	11.3%
• Hyperlipidemia	22.4%
• Infections	7.2%
• Osteopenia	5.8%
• Mediterranean anemia-minor	15.9%
• Osteoporosis	5.8%
• Diabetes mellitus	4.8%
• Cardiovascular diseases	3.8%

## More results

However, we still believe that at this stage of analysis the number of volunteers in different Mediterranean Countries is small. Therefore, we would like to present preliminarily, some valid results (Tables 9, 10, 11 and 12) as well as some valid directions concerning the preventive effect of Med-D on certain chronic diseases and its contribution in health and longevity.

The questionnaire on Med-D included questions concerning the Medical History of the enrolled subjects. In the specific question of whether they had suffered from health

**Table 9: Percentage of Obesity (mean values and SD)**

BMI		% Men	% Women	% Total
Underweight	<20	2.1	10.5	6.4
Normal	20-25	22.2	36.6	29.6
Overweight	25-30	46.9	26.0	36.1
Obese	>30	22.8	26.9	27.8
<b>Mean Value (of BMI)</b>		<b>28.14</b>	<b>26.67</b>	<b>27.38</b>
<b>Standard Deviation</b>		<b>4.36</b>	<b>6.09</b>	<b>5.37</b>

**Table 10: Personal Estimation of the General Condition of Health**

• Very good	25.8%
• Good	53.4%
• Neither good nor bad	17.8%
• Bad	2.7%
• Very bad	0.4%

**Table 11: Perception of the three most important reasons for the rather high rate of mortality found so far**

• Poor nutritional habits	41.4%
• Strees/Anxiety	29.6%
• Smoking	3.8%

**Table 12: Results from a-3-day-diet-recall (mean values and SD)**

INGREDIENT	MALES %	FEMALES %	TOTAL
PROTEIN (g)	71.6 (SD 16.6)	64.7 (SD 16.8)	67.8 (SD 17.0)
TOTAL FAT (g)	72.5 (SD 17.4)	66.2 (SD 17.0)	69.1 (SD 17.5)
CARBOHYDRATES (g)	184.8 (SD 44.6)	177.7 (SD 44.2)	180.9 (SD 44.5)
FIBER (g)	16.0 (SD 5.8)	14.9 (SD 6.2)	15.4 (SD 6.0)
MOISTURE (g)	856.7 (SD 245.1)	754.3 (SD 222.9)	800.8 (SD 238.4)
CALORIES (kcal)	1683.4 (SD 324.4)	1555.7 (SD 299.0)	1613.7 (SD 316.9)
ALCOHOL (g)	4.2 (SD 9.0)	2.1 (SD 7.1)	3.1 (SD 8.1)
CALCIUM (mg)	724.9 (SD 272.8)	730.3 (SD 272.9)	727.9 (SD 272.4)
IRON (mg)	10.6 (SD 2.5)	9.3 (SD 2.4)	9.9 (SD 2.6)
MAGNESIUM (mg)	232.6 (SD 72.8)	202.7 (SD 64.0)	216.3 (SD 69.6)
POTASSIUM (mg)	2236.5 (SD 577.0)	2054.2 (SD 541.0)	2137.0 (SD 564.4)
SODIUM (mg)	2121.6 (SD 687.3)	1947.8 (SD 580.5)	2026.8 (SD 636.2)

problems of chronic nature, 35.2% answered positively and 64.8% negatively. Also, 35.3% were receiving some type of medication at the time of the study and 64.7% were not. Only 14.4% followed a diet plan prescribed by a dietitian, whereas 85.6% did not follow a specific diet.

From all the subjects, 35.3% were taking nutritional supplements and 64.7% were not. Dyslipidemia had the highest percentage (22.4%) from all health conditions suffered in the past 12 months. This was followed by 13.4% with lumbago, 11.3% with hypertension, 9.9% with menopause, 6.6% with gastritis/gastric ulcer, and 5.8% with osteoporosis/osteopenia.

A major part of the questionnaire investigated the nutritional habits of the adult population. In the specific question if breakfast and/or a midmorning snack was

consumed, 24.2% of the enrolled subjects reported that they take breakfast only, 11.1% mid-morning snack only, 61% had both and 3.7% had neither breakfast nor a mid-morning snack. The choices for breakfast were as follows: 94.3% of the sample consumed milk with sugar, free cereals and fibers, 91.7% milk, 86.8% milk with egg and bread, 83.8% bread with honey/marmalade, 76.0% bread with olives, butter or margarine and honey or jam whereas 19.0% humus.

The most popular foods for mid-morning snack were 79.7% for fresh fruits, 74.7% for bakery goods, 79.2% for sandwiches, 61.7% for “others” and, 68.8% just coffee. The meals eaten per day were 2.7 +/- 0.9 and the number of snacks per day were 1.9 +/- 1.12. According to our study, 76.8% of the participants eat breakfast regularly, 76.9% eat lunch, 60.2% eat dinner and 39.9% eat intermediate meals only.

In our study, the use of olive oil in green salads was 98.3% and of olive oil for cooking purposes was 62.8% (Fig 1).



*Fig 1: The use of oil for fresh salads reaches almost 100% in the Med-D study*

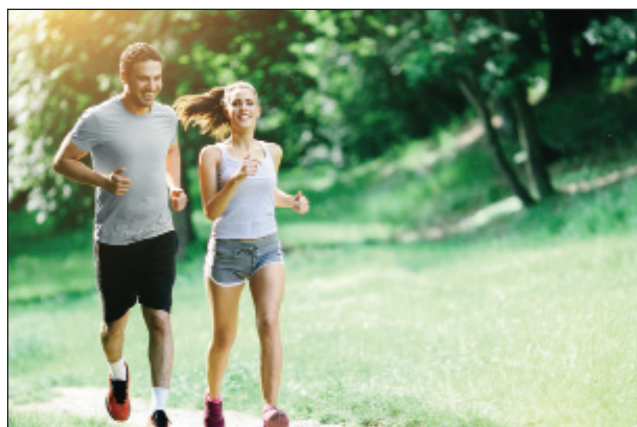
Similarly, this study showed that 29.0% were using other type of vegetable oil, and 2.6% did not know what oil they have used; finally, 3.1% did not cook at home, and 0.4% were using butter.

The majority of adults drink either 1-4 glasses of water only (35.2%), or 5-8 glasses of water (37.3%). Furthermore, 25.3% drink more than 8 glasses of water and only 2.2% drink 1/2 glass per day. The large variety of answers regarding the consumption of water was related to the seasonal nature of water consumption (Fig 2).

Our study also investigated the level of physical activity in the population (Fig 3). On an average day, the subjects spend 9.8 +/- 5.0 hours sitting. On the question how physically demanding their job was, 54.1% reported as very little, 31.6% just little, 7.7% fairly demanding, and 6.6% heavily demanding. During a typical week, the enrolled subjects were spending 1.21 +/- 0.43 days in intense physical activity; 2.08 +/- 1.10 days in medium intensity physical activity, and 2.28 +/- 1.06 days in low-level intensity physical activity.



*Fig 2: Consumption of water*



*Fig 3: Physical activity*

## Discussion

So, what is the Mediterranean Diet? Mediterranean Diet (Med-D) can be defined as a healthy eating pattern contributing to overall health and longevity. Med-D, integrates a number of variations from a basic diet. This integration depends on the heritage and culture of each individual Mediterranean Country.

Med-D, includes mainly plant foods such as fruits, vegetables, cereals, nuts, seeds, and lots of olive oil. Also, dairy products with low consumption of milk and high consumption of low fat cheese, yoghurt and fish, moderate consumption of eggs, low amounts of red meat and low to moderate consumption of wine, mainly with evening meals. Med-D favors local and seasonal food products to a much greater degree.

The basic aim of Med-D study, is to provide an overview of the nutritional habits and values followed by people living in the Mediterranean Region and also to see the long-term effect of this Med-Diet on health and longevity. The Mediterranean Diet Pyramid is a nutrition guide that has been developed under the auspices of WHO in 1993. It summarizes the Mediterranean Diet pattern of eating, suggesting the types and frequency of foods that should be enjoyed every day.

One of the major aims of the second preliminary study was to re-validate the MLAVS questionnaire and also to see its flexibility in practice. These two goals were fulfilled



successfully. The distribution of the questionnaire among towns and urban areas, as well as its completion were even and correctly performed.

## Suggestions

On the basis of the International Literature and on our results so far, we came to the following suggestions concerning Med-D:

Med-D protects against type 2 diabetes. Emphasis on foods that are rich in mono-unsaturated fats and fibers like fruits and vegetables, fish, and olive oil is what makes the Mediterranean diet capable to lower blood sugar and cholesterol especially in diabetics.

Med-D maintains the levels of cholesterol in the blood. This diet seems to reduce the risks of cardiovascular mortality, because it has a positive impact on HDL cholesterol which can accumulate in deposits on the arterial wall.

Med-D keeps people fit as they get older. Thanks to all the nutrients, vitamins, and minerals that are consumed with the Mediterranean diet, there is a reduced risk of developing early muscle weakness and other aging problems.

Med-D reduces risk of developing Alzheimer's and other mental diseases. For seniors, the Mediterranean diet can protect against mental decline enabling aging adults to preserve their quality of life. Similarly, the antioxidants, which are found in Med-D keep cells from undergoing the process of oxidative stress, which causes damage to the body and can contribute to the development of degenerative diseases like Parkinson's disease.

Med-D helps people losing weight as it is easier to stick on this diet for long-term periods or even through the whole life.

Also, it has been shown, that Med-D can reduce the risk of developing cancer. It seems that there is a protective action of this diet when it comes to cancer prevention. In particular, it helps to prevent the development of post-menopausal breast cancer. This matter is under further consideration.

Med-D fights inflammation. Since a major trigger for inflammation is the exposure to oxidative stress, it follows that the high concentration of antioxidants, encouraged by Med-D, can increase the defense system of the body.

Statistics—as shown in the Annual Statistics of the European Union—demonstrated that mortality due to cardiovascular causes is less in the Mediterranean Countries of Europe, whereas, life longevity and health are showing a steady improvement the last fifty years. This, could be related to the beneficial effect of Med-D. Similarly, many local studies, carried out in the Mediterranean Countries, are pointing to the positive nutritious effect of Med-D as a major factor for achieving a long-life health for the local population.

## Overall Points

Taking into consideration that one of the aims of this preliminary study was to re-validate the MLAVS questionnaire and see its flexibility in practice, we believe that

these goals were fulfilled successfully.

New information was also presented on several aspects of the Mediterranean diet. In parallel, we realized that we need to enroll more volunteers from the Mediterranean countries, before reaching final suggestions and conclusions. Despite of that, we feel confident that Med-D study in the future, will shed more light and more evidence on the prevention of cardiovascular diseases.

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