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Evaluation of the degree of compliance to the Mediterranean diet of workers in Greek Post offices

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Abstract

To have a nutritional assessment of the Hellenic Post Services personnel in relation to the Mediterranean diet model.

This cross-sectional study began in June 2012 and the sample collection is still running. It consists of 107 men and women, 63 of the Attica region and 44 from the rest of Greece. A food frequency questionnaire has been used in order employees' dietary habits to be recorded. The MedDietScore (MDS) was assessed for each one of the employees who later received a personal letter with dietary advice. The determinants of MDS were analyzed through multiple linear regression.

The median of the MDS is 32, while at the same time, the grading scale is 0-55. After entering various determinants like place of residence, sex, age, education level, employee position, working years, BMI, smoking and family level at the linear regression, we found that as long as the age and the education level is increased, the MDS is increased by 0,585 (95% CI: 0,524-0,647) and 3,813 (95% CI: 1,66-5,966) respectively, while women in relation to men and employees in relation to their higher level colleagues, have a higher score of 2,964 (95% CI: 0,409-5,519) and 6,653 (95% CI: 3,655-9,652) respectively.

Postal workers in Greece tend to decline from the Mediterranean diet. Creating policies and campaigns in order to inform the public about the benefits of the Mediterranean diet on health, is of significant importance.

Keywords: Mediterranean diet, dietary index, health promotion

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1 Introduction

The Mediterranean diet is considered as the representative dietary pattern of people around the Mediterranean Sea. In recent decades, the scientific community has recognized, through plethora of clinical and epidemiological studies, the significant role that Mediterranean diet plays in the cardiovascular system health [1,2], the mental and physical health [3,4], the life quality improvement [5-7] etc. Since the first studies focused on the Mediterranean diet, like in the Seven Countries Study [8], the components of specific foods that consist the Mediterranean diet were examined for their beneficial role, while in more recent studies, the main field of interest was the examination of the dietary pattern holistically [9,10]. Thus, the interactions between food components and the fact that people consume food groups rather than individual nutrients were taken into account.

As far as the dietary indexes - that are used for evaluating the degree of adherence to this dietary pattern – are concerned, it seems that they are associated to lower total mortality and mortality from cardiovascular diseases and cancer [11] while at the same time, for the dietary index 'MedDietScore' that is used in this study, it was observed that an increase of 11/55 in rating scale, is related to 27% lower probability for acute coronary syndromes [12]. Moreover, the same diet score seems to be a valid tool for assessing the quality of an adult's diet [13,14].

However, it seems that today dietary habits of Greeks [15,16] and particularly of young-aged people [17,18], tend to be more westernized, as a result of the intense urbanization that seems to affect them significantly [19]. The economic crisis and low income may also contribute to it [20,21]. This fact raises concerns and increases the interest for further investigation of the factors that lead to the above mentioned westernized pattern, making the creation of policies and campaigns that will contribute to promoting Greek people's health in the long term, of significant importance. Workplace is a challenging place for implement health promotion programs toward the adoption of healthier nutritional habits.

1.1 Objective

The aim of the present study is the evaluation of the compliance degree to the Mediterranean diet of workers in Greek Post Offices and the provision of individualized nutritional recommendations, so as their health to be promoted and protected.

2 Materials and Methods

2.1 Study Design

The present study is a cross-sectional study with recurring character since the design includes reassessment of the dietary habits in the long run and after the employees will have received their personal recommendations concerning the improvement of their dietary habits.

2.2 Sample of the Study/Sampling

Data collection took place from June 2012 and is still running. The sample is consisted of 107 employees of Greek Post Offices (65 men, 42 women), of which 63 people come from Attica and 44 from the rest of Greece. Sample collection was a random, population related procedure. For the sampling procedure, the Head of each Greek Post service (14 distribution units and 4 offices of Greek Post services were involved), was contacted both by phone and by email for the aims of this health promotion program, by the Head of the Central Hellenic Post service.

2.3 Questionnaire

Demographical and anthropometric characteristics, medical and pharmaceutical history, smoking habits and dietary habits were included in the whole questionnaire. For recording employees' dietary habits, a semi-quantitative food frequency questionnaire (FFQ) was used. Participants set out to answer how often they consume various foods (dairy, cereals, meat, fruits, vegetables, sweets, alcoholic beverages etc.) with the following options for the frequency of consumption: 'never / rarely, 1-3 times / month , 1-2 times / week, 3-6 times / week , 1 time / day , ≥ 2 times / day".

2.4 Evaluation of the degree of compliance

For evaluating the dietary intake of volunteers and the adherence to the Mediterranean diet, the MedDietScore - which includes 11 food categories (whole grain products, fruits, vegetables, potatoes, legumes, fish, poultry, red meat, full-fat dairy, olive oil, alcohol beverages) - was used, through monotone and non- monotone discrete functions. The rating scale of the index ranges from 0-55, with the greatest value to characterize the optimum adherence to the Mediterranean diet [12].

2.5 Dietary recommendations

Each one of the employees received an evaluation of his nutritional profile and a personal letter about individual counseling and nutritional recommendations for the improvement of his dietary habits. Specifically, a 4 column table was presented (Table 1) in every personal letter. The first column included all the food categories that represent the Mediterranean diet, the second one recommended the consumption of each food category as defined by the Hellenic Ministry of Health according to the Mediterranean model, the third one presented the consumption of each food by employees and finally, the fourth column presented (with symbols and arrows) the suggestions about increasing or decreasing of each food consumption. In the end, a summary of all the proposed changes related to employee's dietary habits improvement was given.

Table 1: A part of the personal letter that describes employees' suggested adjustments concerning their dietary habits (example)

Foods	Recommendations	Your consumption	Suggested adjustments
Bread, pasta, rice and other whole grains	8 servings/day	4-5 servings/day	↑
Vegetables	6 servings/day	3-6 servings/week	↑
Fruit	3 servings/day	3-6 servings/week	↑
Olive oil	Main fat source	Main fat source	✓
Dairy products	1-2 servings/day	1 serving/day	✓
Fish	2 servings/week	1-2 servings/week	✓
Poultry	1-2 servings/week	1-2 servings/week	✓
Olives, legumes and nuts	3-4 Servings/week	1-2 servings/week	↑
Potatoes	Up to 3 servings/week	2 servings/week	✓
Eggs	Up to 3 servings/week	Never/Seldom	↑
Sweets	Up to 3 servings/week	1-2 servings/week	✓
Red meat	1-2 servings/month	2-3 servings/week	↓

2.6 Statistical analysis

Student's t-test was checked in order the mean and the standard deviation of BMI to be calculated. The median and the non-parametric Mann-Whitney U-test were used for the correlations of those variables that did not appear to follow the standard normal distribution. When the MDS is associated with the variables sex, region of residence and employee state and when the same variable is associated with age, educational and family status, Mann-Whitney U-test and Kruskal-Wallis test are used, respectively. The MedDietScore was correlated with all the variables through the multiple linear regression. For the execution of the linear regression, all the appropriate conditions were tested. For all the correlations, the p-value <0.05 was used for assessing the statistical significance. All of the analyses were performed via the statistical program SPSS (IBM Statistics 20).

3 Results

In tables 2, 3 and 4, data about the descriptive characteristics of the study, the presence of disease and medication, and the smoking habits and body mass index are respectively presented.

Table 2: The sample descriptive characteristics

		N	%
Sex	Men	65	61
	Women	42	39
Age (years)	18-36	14	16
	37-56	62	79,5
	57-99	13	14,5
Educational status	Elementary education graduates	1	1
	High-school graduates	60	60,6
	University graduates	38	38,4
Family status	Single	21	20,8
	Married	75	74,3
	Divorced	5	4,9
Residence	Attica	63	58,9
	Rest of Greece	44	41,1

Table 3: Data on the presence of disease and medication

	N	%
Hypertension	14	13,7
Hypercholesterolemia	8	7,9
Diabetes mellitus	7	6,9
Cardiovascular diseases	3	2,9
Kidney failure	1	1
Cancer	0	0
Antihypercholesterolemics	6	5,8
Antihypertensives	11	10,7
Antidiabetics	5	4,9
Insulin	2	1,9

Table 4: Smoking habits and Body Mass Index

	Total sample
Smoking, n (%)	33 (34,7)
Body Mass Index (kg/m2), mean ± s.d.	26,59 ± 4,6
Normal-weighted (BMI<25)	31 (36,9)

Body Mass Index, n (%)	Over-weighted (25≤BMI<30)	38 (45,24)
	Obese (BMI≥30)	15 (17,86)

In the table below (table 5), it seems that the median for the MedDietScore is 32. The particular value belongs to the third grading scale, 28-41, that describes an average to good adherence to the Mediterranean diet model.

Table 5: Food consumption frequency * per week

	Median
MDS	32
Whole grains	1,5
Potatoes	1,5
Fruit	7,5
Vegetables	9
Legumes	1,5
Fish	1
Poultry	1,5
Red meat	3,5
Full-fat dairy products	1,5
Olive oil	7
Alcohol beverages	1,5

*The frequency is described by portions consumed per week:
Portion references : 1 slice of bread (25g), ½ cup of rice or pasta (50-60g), 1/2 cup of cereals , 100g potatoes, 1 cup raw or ½ cup boiled vegetables, 1 medium fruit , ½ cup of fruit juice, 200g melon/watermelon , 30g grapes , 1 cup of milk (240mL) or yogurt , 30g cheese , 150g lean beef or pork or chicken or fish or seafood, 1 cup of cooked dry beans (100g), 1 egg , 1 glass of wine (250mL), 10 small or 5 large olives , 1 small cup of nuts
Reference: Supreme Scientific Health Council, Hellenic Ministry of Health

Before the execution of the logistic regression, the MDS was related to each one of the following variables: sex, age, educational status, family status, residence and employee state. The correlation between the MDS and age was found to be statistically significant with a p-value = 0,011 <0,05.

In the first model of the multiple linear regression, the variables sex, age, residence regions (Attica/rest of Greece), educational status, employee state (distribution/office), employee rank (employee/head), working years, Body Mass Index, family status and smoking (yes/no) were included. The variables that remained in the final model of the

regression are presented in table 6. Using the Analysis of Variance test (ANOVA), the R-square and the p-value occur 0,985 and <0,01 respectively and make the model formed by the variables presented in the table valid and highly explanatory.

Table 6: Final model of the multiple linear regression

	B	p-value	95% CI
Sex	**2,964**	**0,024**	**0,409-5,519**
Age	**0,585**	**0,000**	**0,524-0,647**
Educational status	**3,813**	**0,001**	**1,66-5,966**
Employee rank	**-6,653**	**0,000**	**-9,652-(-3,655)**

Depended variable: MDS

4 Discussion

The analysis of nutritional habits of a professional group is necessary for the planning and implementation of health promotion programs within this group. The selection of the specific professional group has been decided because of the easier accessibility there could be achieved, due to the long-term cooperation and close contact of the study coordinator with the Post Office services managers. Thus, the effort to observe and promote the health status of this group of people has been made easier and more obtainable. In addition, it is a group of employees disseminated all over Greece with a broad variety of income and educational level. Consultancy through correspondence may lead to valuable conclusions for the effectiveness of this way of individual information provision and the informing of employees.

In table 4, the percentage of overweight people was found to exceed 45% while the percentage of obese people approaches 18%. These findings, although they are not concluded by a representative sample of the population, seem to agree with the trend of recent years where, as shown by recent data from Eurostat, the obesity rate in Greece keeps growing rapidly and is almost 17,6%, on average – for men and women over 18 years old - while the equivalent percentage of overweight people reaches 38,7%b [22]. Moreover, in the same table, the mean of the Body Mass Index appears to be 26,59 kg/m^2 , a finding which also seems to be in agreement with the most recent data of the World Health Organization about Greece [23], where in a sample of 2.439 men, the mean of the BMI is 26,5 kg/m^2 while in a sample of 2.564 women, the relevant index is 25 kg/m^2. As far as smoking is concerned, the percentage of smokers in the sample approaches 35% and is also very close to certain recent data presented by WHO, according to which 45% of men and 38% of women are smokers [24].

The median of the MDS for the entire study sample is equal to 32. The grading scale, using the MDS index, ranges from 0-55, so the average of the MDS is 27.5 and indicates a moderate adherence to the Mediterranean diet. Regarding the frequency of consumption of food categories per week, it seems that employees rarely consume whole-grain products such as whole-grain bread, brown rice and pasta (median: 1.5 servings/week). The observation of the food frequency questionnaire responses enabled us to detect the high consumption of white bread and after certain communications made between researchers and respondents, it was found that the taste is the most crucial factor that

affects the choice between common refined non whole-grain products and whole-grain products. Moreover, the probable ignorance about the nutritional benefits of the latter has undoubtedly to be taken into account. According to the red meat consumption, it seemed that the employees consumed 3,5 servings/week when the model of the Mediterranean diet recommends the consumption of 1-2 servings/month. The above finding is intersected with some of the 'Attica' study results, where the dietary habits of 3.042 adults were evaluated and was found that they consumed large amounts of red meat and sweets and small amounts of fish, vegetables and whole-grain cereals in relation to the recommendations of the Hellenic Ministry of Health [25]. In this case, the ignorance about the harmful role of saturated fat acids on health in the long run, as well as the traditional perceptions that 'a meal without meat is not a real meal', -as many of the study participants usually stated- are the basic beliefs that we have to recall through the dietary intervention in this study. Finally, it's worth commenting on the olive-oil use, as its average consumption results 7 servings/week and indicates that it keeps being the main fat source used be Greek people. Thus, not only by this study but also by another one [26], the maintenance to the traditional use of olive oil is clearly demonstrated, even for processes like frying, where its use in comparison with other oils, is considered to be rather costly.

Through the multiple linear regression, it seems that age is one of the factors that describes – with statistical significance – the MDS and this fact may indicate that although the oldest generation of Greeks was quite complied with the Mediterranean dietary pattern [27-28], the dietary habits of young people tend to approach a more westernized pattern [18,29]. This fact requires the immediate scientific intervention by the operators of primary health care aiming at people's health promotion. Apart from the age, the MDS index is appeared to be also described by the gender as women in relation to men have a higher score of 2,964, while at the same time, all the other variables that describe the MDS, remain stable. A matching finding by Attica study, described that women were more adherent to the Mediterranean diet than men as the latter tended to consume greater amounts of alcohol, coffee and quick meals compared to women [30]. Education is another variable that is positively correlated with the MDS, demonstrating that the full awareness of the benefits that an adherence to such a type of a dietary pattern could offer, can affect the food choices, something that is also observed by a cross-sectional study, in which it's highlighted that knowledge is actually the key factor for predicting the compliance with the Mediterranean diet model [31,32].

Limitations

The cross-sectional character of the study does not allow us to extract valid conclusions as long as the determination of causes and effects is not possible. Moreover, bias on the part of the researcher should be taken into account.

5 Conclusions

It seems that postal workers in Greece tend to have a more westernized dietary pattern, richer in energy and saturated fat acids in relation to the Mediterranean diet pattern. Creating policies and campaigns in order to inform the public about the benefits of the Mediterranean diet on health, is of significant importance. It should be noted that the efforts made in the above study is a methodological proposal and a pilot evaluation of a prospective research protocol, in which not only the investigation of the dietary habits of

workers in Greek Post offices but also the assessment of their physical activity will be included. Furthermore, the provision of personal recommendations concerning the above-mentioned as well as the reassessment of them after a reasonable period of time, will take place.

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