

FUNCTIONAL FOODS IN FAVOR OF THE PREVENTION AND TREATMENT OF CARDIOVASCULAR DISEASES

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Abstract: Cardiovascular diseases are one of the most commonly met in the world. They are also one of the leading causes of death from chronic non-communicable diseases. Over the last decade, demand for foods and beverages that help improve or benefit health has increased in many parts of the world, along with rising health care costs, increased life expectancy, and a desire for a higher quality of life. The response to functional foods depends on several factors, including genetics, physiological condition, and the composition of the entire diet. Despite growing evidence of the influence of phenolic compounds in the pathogenesis of obesity, the true cause is not fully understood.

The aim of this study was to determine the level of impact of certain functional foods on the BMI of the studied patients associated with the risk of cardiovascular disease.

For this research were used the survey and statistical methods. 40 patients from the Clinic of Cardiology of the University Hospital "St. George" LTD - Plovdiv, aged 27 to 84 (mean 61.3 years \pm 14.3). 45% of the group are men (n = 18), 55% are women (n = 22).

The BMI of the respondents is from 16.73 to 54.32 (mean 28.38 \pm 5.87). The effect of several functional foods on patients' BMI was studied. Only those who consumed red wine (p = 0.029), oatmeal (p = 0.006) and chocolate (p = 0.041) showed a statistically significant difference in BMI. Age did not affect the BMI of the studied patients (p = 0.787), as well as the intake of the functional foods we studied (p > 0.05). The study showed that patients receiving oatmeal (more than 2-3 times a week) had a lower BMI (below the average of 28.38) compared to those who did not consume ($\chi^2 = 5.58$, df = 1, p = 0.041). Patients consuming red wine have similar results in terms of their BMI - lower when consuming this drink more than 2-3 times a week ($\chi^2 = 6.67$, df = 1, p = 0.022). The mean BMI in female patients was 30.4 \pm 6.1 and in men 25.9 \pm 4.8.

Functional foods are able to provide health benefits through bioactive compounds that manage, prevent and / or treat disease. Clarifying the exact role that foods play is important in maintaining and promoting our health.

Keywords: cardiovascular disease (CVD), nutrition, functional foods, oatmeal, red wine, Medical sciences and healthcare

1. INTRODUCTION

Cardiovascular diseases are one of the leading diseases in the world. The most common are arterial hypertension, coronary artery disease, myocardial infarction, ischemic heart disease, atherosclerosis, rheumatic heart disease, endocarditis and myocarditis (Georgieva, 2013). They are also one of the leading causes of death from chronic non-communicable diseases. Over the last decade, demand for food and beverages that improve or benefit health has increased in many parts of the world, along with rising health care costs, increased life expectancy and a desire for a better quality of life (Ozen, Pons & Tur, 2012).

Functional foods are able to provide health benefits through bioactive compounds targeting mechanisms that manage, prevent and / or treat disease (Martirosyan & Miller, 2018). Interest in these 'functional' foods and their active ingredients is driven by rising healthcare costs, recent legislative developments and growing scientific evidence. Increasingly, scientists are being asked to clarify the exact role that food plays in maintaining and promoting health. The response to functional foods depends on several factors, including genetics, physiological condition, and the composition of the entire diet. Although the assessment of the benefits or risks of food does not usually involve the same in-depth research as that required for medicines, this does not eliminate the need for reliable scientific information to make recommendations to the consumer. Identifying sensitive and reliable biomarkers will be key to adequately assessing the true effect of foods and their components (Milner, 1999).

Large-scale, long-term studies have consistently shown an increased risk of CVD morbidity and mortality in overweight and obese individuals. In 2013, the American Heart Association (AHA), the American College of Cardiology (ACC), and the Obesity Society developed updated guidelines for managing obesity, recommending weight loss in obese or overweight individuals with at least one risk factor for GVHD or obesity. (Xia, Lloyd-Jones & Khan, 2019). There is a positive association between baseline BMI and the risks of ischemic stroke, haemorrhagic stroke and coronary heart disease, with every 2 kg / m² lower BMI being associated with a 12% lower risk of ischemic stroke, an 8% lower risk of haemorrhagic stroke and 11% lower risk of coronary heart disease (Asia Pacific Cohort Studies Collaboration, 2004). Recently, nutrition research has focused on the relationship between atherosclerosis, on the one hand, and nutritional nutrients and dietary patterns, on the other.

The aim of the study was to determine the level of impact of certain functional foods on the BMI of the studied patients associated with the risk of cardiovascular disease.

2. MATERIALS AND METHODS

The object of the study are 40 surveyed patients in the Clinic of Cardiology of the University Hospital "St. Georgi EAD - Plovdiv. The following methods were used:

Questionnaire method: A direct individual survey was conducted with open and closed questions. Factors such as gender, age, education, body weight, height and information on the intake of certain functional foods have been identified.

Statistical methods: Descriptive analysis was used, determining the main descriptive statistical values of the variation variable: arithmetic mean (mean) and standard deviation (SD). Variation analysis was also used. The difference between the mean values of the normally distributed quantitative variables of two independent groups was estimated using the unpaired t-test for independent groups (Unpaired t-test, Independent-samples t-test). The frequency of expression of the qualitative (category) variables in the studied groups was determined in 2x2 and cross-tables and was assessed with the Chi-square (x²) Pearson test (Pearson x² test).

3. RESULTS

40 patients from the Clinic of Cardiology of the University Hospital "St. Georgi EAD - Plovdiv, aged 27 to 84 (mean 61.3 years \pm 14.3). 45% of the group are men (n = 18), 55% are women (n = 22). The BMI of the respondents is from 16.73 to 54.32 (mean 28.38 \pm 5.87).

On the table. 1 shows the BMI of patients according to the intake of functional foods more than 2-3 times a week or less.

Table. 1 BMI of the studied patients according to the intake of functional foods

	More than 2-3 times a week		Less often		Degree of significance p (Independent-samples t-test)
	BMI	n (%)	BMI	n (%)	
Yoghurt	29.4 \pm 6.2	26 (65%)	26.6 \pm 4.9	14 (35%)	0.231
Dairy products	27.4 \pm 4.1	28 (70%)	30.5 \pm 8.5	12 (30%)	0.247
Coffee	29.1 \pm 6.1	29 (72%)	26.2 \pm 4.8	11 (28%)	0.229
Tea	27.7 \pm 3.6	25 (62%)	29.5 \pm 8.4	15 (38%)	0.581
Red wine	27.7 \pm 6.8	24 (60%)	29.4 \pm 4.1	16 (40%)	0.029*
Soy	27.1 \pm 3	8 (20%)	28.7 \pm 6.4	32 (80%)	0.434
Oats	25.6 \pm 3.8	13 (33%)	29.7 \pm 6.3	27 (67%)	0.006*
Chocolate	29 \pm 5.8	34 (85%)	24.6 \pm 4.9	6 (15%)	0.041*

* statistical significance (p<0.05)

Figure 1 shows that patients receiving oatmeal (more than 2-3 times a week) have a lower BMI (below the average of 28.38) compared to those who do not consume (x²=5.58, df=1, p=0.041). Patients consuming red wine have similar results in terms of their BMI - lower when consuming this drink more than 2-3 times a week (x²=6.67, df=1, p=0.022).

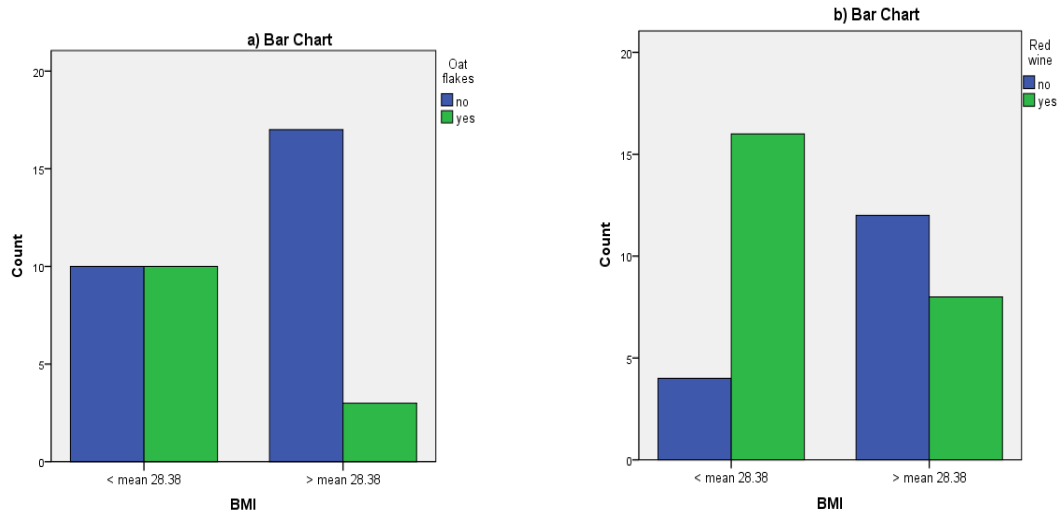


Fig. 1 BMI in the patients studied according to the intake of oatmeal (a) and red wine (b).

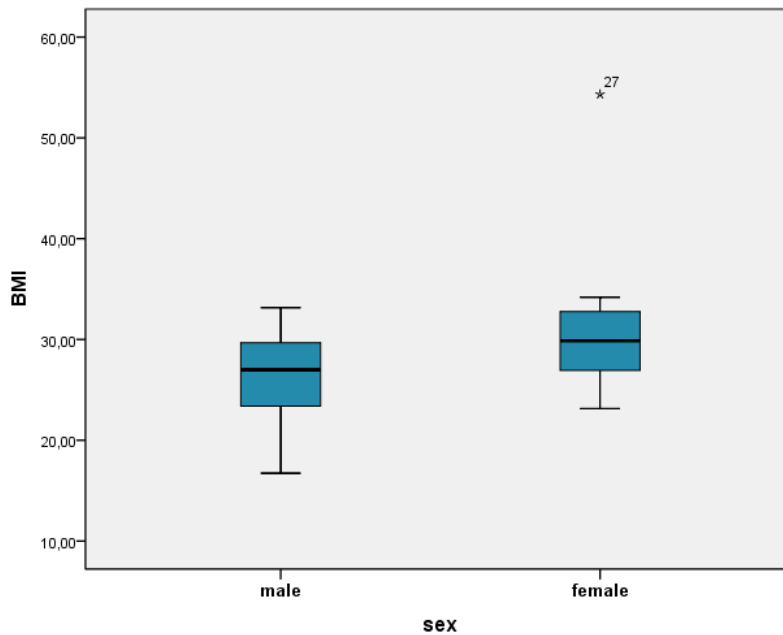


Fig. 2 BMI of the studied patients by gender

The average rate of BMI in female patients was 30.4 ± 6.1 and in men 25.9 ± 4.8 (Figure 2). Age did not affect the BMI of the studied patients ($p = 0.787$), as well as the intake of the functional foods we studied ($p > 0.05$).

4. DISCUSSION

The spread of obesity worldwide has reached pandemic proportions. Despite growing evidence of the influence of phenolic compounds in the pathogenesis of obesity, the true effect is not fully understood. Available in vitro and in vivo studies show that phenolic compounds (in red wine, plants) reduce food intake, reduce lipogenesis, increase lipolysis, stimulate β -oxidation of fatty acids, inhibit the differentiation and growth of adipocytes, weaken inflammatory and inflammatory reactions. oxidative stress (Rodríguez-Pérez, Segura-Carretero & del Mar Contreras, 2019).

The results of modern epidemiological studies show that higher consumption of fruits, vegetables without starch, nuts, legumes, fish, vegetable oils, yogurt and whole grains, along with lower intake of red and processed meats, foods with more -high content of refined carbohydrates and salt collaborates with a lower incidence of

cardiovascular events. Moreover, this shows that replacing animal fats, including milk fats, with plant sources of fats and polyunsaturated fatty acids can reduce cardiovascular risk (Aleksova & Yonal, 2020).

In recent decades, several studies on both humans and animals have shown that moderate consumption of red wine has a beneficial effect on health. Phenolic compounds are the main components whose antioxidant and anti-inflammatory properties can reduce insulin resistance and have a beneficial effect by reducing oxidative stress. As a consequence, it is the prevention of cardiovascular disease. Various mechanisms are involved in the cardioprotective effects of moderate red wine consumption: while alcohol is responsible for increasing plasma HDL-C, polyphenols play a key role in reducing the incidence of T2D (type 2 diabetes) and LDL oxidation. However, more in-depth knowledge is needed to understand the molecular basis of the potential mechanisms involved (Castaldo et al., 2019). Alcohol, resveratrol and other polyphenolic compounds increase the bioavailability of nitric oxide, thus counteracting the development of endothelial dysfunction, reducing blood viscosity, improving insulin sensitivity, counteracting platelet hyperactivity, inhibiting platelet inhibition and inhibiting adhesion. von Willebrand factor, fibrinogen and coagulation factor VII (Lippi, Franchini, Favalaro & Targher, 2010). Our research unequivocally confirms the data in the literature on the beneficial effect of moderate red wine consumption on BMI, which is associated with one of the risk factors for CVD (Table 1 and Figure 1).

The hypocholesterolemic effect of the cocoa mass in chocolate is due to the plant sterols and polyphenols contained in it - a subclass of flavonoids and especially flavanols. A healthy diet with chocolate helps reduce cholesterol levels in low-density lipoprotein (LDL) and control blood pressure. Moderate chocolate intake helps reduce the risk of cardiovascular disease by 30% by affecting cardiometabolic disorders. It should be borne in mind that the above concerns the so-called black chocolate. In our study, only 20% of the patients studied consumed dark chocolate. In milk chocolates, calcium from milk reduces the positive effect of polyphenols (Markov, Markova, & Vodenicharova, 2018).

Oats and oat products are an important source of nutrients and fiber in human nutrition. A study conducted by researchers in Taiwan (Chang et al. 2013) shows that the use of oatmeal is important for visceral fat distribution and for the prevention of obesity. Oat cereals are rich in β -glucans, which lower the glycemic index and modulate the levels of the hormones ghrelin and leptin, which are responsible for regulating hunger and satiety. The low glycemic index of oat products (average 40) leads to a stronger saturating effect than those of products with high glycemic index due to the presence of indigestible forms of carbohydrates included in oat products (Janda et al., 2019). The results of BMI studies of our patients confirm the data in the literature on the beneficial effect of frequent consumption of oatmeal on obesity (Table 1 and Fig. 1).

5. CONCLUSION

Diet affects the BMI of patients with CVD. More frequent intake of oatmeal, chocolate and red wine reduce the body weight of patients. The intake of other functional foods yogurt and dairy products, coffee, tea and soy does not affect the BMI of patients, most likely due to the low number of participants in the target group.

More studies in larger groups of participants are needed to expect better statistically significant results. Future studies on blood counts would shed light on the link between obesity and the intake of functional foods.

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