



ORIGINAL ARTICLE

## Effects of the Mediterranean diet and exercise in subjects with coronary artery disease<sup>☆</sup>



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### KEYWORDS

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Mediterranean diet;  
Exercise program

### Abstract

**Introduction:** The association of the Mediterranean diet and exercise appears to have a protective role, reducing cardiovascular risk. This study investigated the effects of education sessions on the Mediterranean diet and an exercise program in modifying eating behaviors, body composition and abdominal fat.

**Methods:** An experimental study was performed on 20 subjects with known coronary heart disease randomly assigned to experimental (n=10) and control (n=10) groups. Both groups received education sessions on the Mediterranean diet, but the experimental group also followed an eight-week program of specific exercises. A semiquantitative food frequency questionnaire was administered to analyze food intake, bioimpedance was used to measure weight, fat mass and lean mass, and waist circumference was measured to calculate waist-to-height ratio.

**Results:** After eight weeks, protein (p<0.05) and cholesterol (p<0.05) intake in the experimental group had decreased significantly compared with the control group. Between the beginning and end of the study, there were significant decreases in the control group in carbohydrate (p<0.05) and saturated fat intake (p<0.05). In both groups the percentage of total fat (p<0.05) and fat mass (p<0.05) was significantly decreased. In the experimental group the waist-to-height ratio was significantly reduced (p<0.05).

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**PALAVRAS-CHAVE**

Doenças cardiovasculares;  
Reabilitação cardiovascular;  
Dieta mediterrânea;  
Programa de exercícios

*Conclusion:* The Mediterranean diet reduced carbohydrate and saturated fat intake, reflected in reduced fat mass. The association of the exercise program showed additional benefits in reduction of protein and cholesterol intake and abdominal fat.

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**Efeitos da dieta mediterrânea e exercício físico em indivíduos com doença arterial coronária****Resumo**

*Introdução:* A associação da dieta mediterrânea e de exercício físico parecem apresentar um papel protetor na diminuição do risco cardiovascular. Este estudo pretende verificar os efeitos de sessões de educação fundamentadas na dieta mediterrânea e de um programa de exercícios na modificação de comportamentos alimentares, composição corporal e gordura abdominal.

*Métodos:* Estudo experimental composto por 20 indivíduos, com doença arterial coronária conhecida, distribuídos aleatoriamente em dois grupos: experimental (n = 10) e controlo (n = 10). Ambos os grupos foram sujeitos às sessões de educação para a saúde, mas o grupo experimental executou um programa suplementar de exercícios específicos durante oito semanas. Foi utilizado o questionário semiquantitativo de frequência alimentar para análise da ingestão de alimentos, a bioimpedância para medição do peso, massa gorda e massa magra, e o perímetro da cintura para cálculo da razão cintura-estatura.

*Resultados:* Após as oito semanas, o grupo experimental ingeriu significativamente menos proteínas (p < 0,05) e colesterol (p < 0,05) em comparação com o grupo controlo. Do momento inicial para o final, verificou-se apenas no grupo controlo uma diminuição significativa na ingestão de hidratos de carbono (p < 0,05) e de gorduras saturadas (p < 0,05). Ambos os grupos diminuíram significativamente a percentagem de gordura total (p < 0,05) e massa gorda (p < 0,05). O grupo experimental diminuiu significativamente a razão cintura-estatura (p < 0,05).

*Conclusão:* A dieta mediterrânea reduziu a ingestão alimentar de hidratos de carbono e gorduras saturadas, refletindo-se na redução da massa gorda. A associação do programa de exercícios demonstrou benefícios acrescidos na diminuição da ingestão de proteínas e de colesterol, assim como na redução da gordura abdominal.

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**Introduction**

Cardiovascular disease is the leading cause of death in Europe. It is responsible for over four million deaths annually,<sup>1</sup> and is one of the main causes of morbidity in Portugal and in Europe as a whole.<sup>1,2</sup>

Cardiac rehabilitation (CR) is a multidisciplinary intervention that includes components designed to reduce cardiovascular risk, encourage healthy behaviors, reduce physical impairment and promote an active lifestyle. The main elements of a CR program are counseling on exercise and control of modifiable cardiovascular risk factors such as hypertension, smoking, dyslipidemia, diabetes, sedentary lifestyle, obesity, alcohol abuse, stress and depression.<sup>2,3</sup>

Lifestyle and diet are considered the main modifiable factors in cardiovascular prevention, with health benefits being achieved by increasing exercise levels and adopting a healthier diet.<sup>4,5</sup>

The Mediterranean diet is characterized by plentiful plant foods such as bread, pasta and rice, green vegetables

and legumes, fresh fruit, olive oil as the main source of fats, moderate quantities of fish, poultry, dairy products and eggs, small quantities of red meat and moderate consumption of wine, usually with meals. The diet is notable for its low levels of saturated fatty acids and high levels of monounsaturated fats, complex sugars, dietary fiber and antioxidants.<sup>6</sup> It protects against coronary artery disease and is associated with reduced cardiovascular mortality.<sup>6,7</sup> As well as its antioxidant and anti-inflammatory properties, which appear to be behind the reduction in cardiovascular risk,<sup>4,8</sup> the Mediterranean diet may also help control weight and combat obesity.<sup>9</sup> The absolute quantity of body fat is less important than its anatomical distribution, with greater accumulation of adipose tissue in the abdominal region (male pattern) being associated with metabolic complications.<sup>10,11</sup> The energy imbalance that leads to overweight is due not only to unhealthy eating habits but also to a sedentary lifestyle.<sup>12</sup>

In a study of 28 European countries, the European Association for Cardiovascular Prevention & Rehabilitation showed

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