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Cardiovascular risk profile of young adults: Changes over time☆

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KEYWORDS
Cardiovascular risk;
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HeartScore

Abstract
Background and Objective: The high prevalence and natural history of atherosclerosis make young people important targets for cardiovascular prevention. This study aimed to analyze changes over time in the cardiovascular risk profile of a population of healthy young adults.
Methods: We studied 923 Portuguese Air Force applicants between 1991 and 2007, divided into two-year periods. In addition to cardiovascular risk factors, the Framingham score and HeartScore were calculated for age 65. Cochran-Armitage and Jonckheere-Terpstra tests for trend were used for categorical and continuous variables, respectively.
Results: Mean age was 19.2±2.3 years (p=0.34) and 55 applicants (6%) were female (p=0.56). Mean body mass index was 22.4±2.5 kg (p for trend 0.35). The number of smokers decreased over the study period (11.6 vs. 7.0%, p for trend 0.02). Of the total number of applicants, 122 (13.2%) were classified as hypertensive. Mean systolic blood pressure was 127±12 mmHg and increased significantly over time (122±13 vs. 128±11 mmHg, p for trend <0.001). Hypercholesterolemia was found in 108 applicants (11.7%) and total cholesterol showed an improvement (170±35 vs. 155±26 mg/dl, p for trend <0.001). The mean modified Framingham score was 12.6±5.1 and improved over the study period (12.9±5.9% vs. 11.9±4.7%, p for trend 0.006). The mean modified HeartScore was 3.2±1.4 and remained unchanged (p for trend 0.10).
Conclusions: In our population, except for an increase in systolic blood pressure values, there was an overall improvement in cardiovascular risk from 1991 to 2007. Further studies are needed to better assess the situation in Portugal and help devise preventive strategies in young people.

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PALAVRAS-CHAVE
Risco cardiovascular;
Adultos jovens;
Score de Framingham;
HeartSCORE

Perfil de risco cardiovascular de adultos jovens saudáveis – evolução temporal

Resumo
Introdução e objetivos: A elevada prevalência e a história natural da doença aterosclerótica tornam os jovens um alvo importante da prevenção cardiovascular. O objetivo deste trabalho foi caracterizar a evolução temporal do perfil de risco cardiovascular de uma população de adultos jovens saudáveis.
Métodos: Foram estudados retrospetivamente 923 candidatos às especialidades aeronáuticas da Força Aérea, entre 1991-2007, divididos por biénios. Avaliaram-se os fatores de risco cardiovascular, *score* de Framingham e *HeartScore*, para uma idade modificada de 65 anos. Utilizaram-se os testes de *Cochran-Armitage* e de *Jonckheere-Terpstra* para tendência, em variáveis categóricas e contínuas, respetivamente.
Resultados: A idade média foi de 19,2±2,3 anos (p=0,34) e 55 (6%) dos candidatos eram do sexo feminino (p=0,56). O índice de massa corporal médio foi de 22,4±2,5 kg/m^2 (p para tendência=0,35). O número de fumadores decresceu ao longo dos biénios (11,6 *versus* 7,0%, p para tendência=0,02). Cento e vinte e dois (13,2%) dos candidatos eram hipertensos. A pressão arterial sistólica média foi de 127±12 mmHg, observando-se um aumento temporal significativo (122±13 *versus* 128±11 mmHg, p para tendência <0,001). Cento e oito (11,7%) dos candidatos tinham hipercolesterolemia e o colesterol total melhorou (170±35 mg/dL *versus* 155±26 mg/dL, p para tendência <0,001). O *score* de Framingham modificado médio foi de 12,6±5,1 e melhorou ao longo dos biénios (12,9±5,9% *versus* 11,9±4,7%, p para tendência=0,006), não se observando alterações no valor médio do *HeartSCORE* modificado (3,2±1,4, p para tendência=0,10).
Conclusões: Na população estudada, excetuando os valores da pressão arterial sistólica, registou-se uma melhoria global do nível de risco cardiovascular entre 1991-2007. São necessários mais estudos para um melhor conhecimento da realidade portuguesa e otimização de estratégias preventivas nesta faixa etária.

Introduction

Statistics for the last decade show that atherosclerotic cardiovascular (CV) disease is still the leading cause of death in Portugal, accounting for 31.9% of mortality in 2009.[1] Despite a progressive decline in mortality rates from both coronary artery disease (CAD) and stroke, absolute numbers of deaths attributable to CV disease remain high and justify ongoing preventive measures.[1,2]

The subclinical stage of the atherosclerotic process begins long before the average age of symptom onset, as demonstrated by various autopsy studies that show an association between number of CV risk factors and severity of asymptomatic coronary and aortic lesions in adolescents and young adults.[3,4] Despite these results, there have been few studies on CV risk in the young, particularly using risk scores.

Against this background, the aim of this study was to analyze recent changes in the main CV risk factors in a population of healthy young adults and to classify their risk through validated scores, namely the HeartScore and Framingham scores.

Methods

Population and study design

This was an observational, descriptive, retrospective study of 923 Portuguese Air Force applicants between 1991 and 2007, for four two-year periods – 1991/2, 1996/7, 2001/2 and 2006/7.

Study variables

The following variables were analyzed: age, gender, body mass index (BMI), systolic blood pressure (SBP), diastolic blood pressure (DBP), fasting glucose (in mg/dl), total cholesterol (in mg/dl), LDL cholesterol (in mg/dl), HDL cholesterol (in mg/dl), and smoking (any tobacco consumption in the previous year). Blood pressure was measured using a mercury sphygmomanometer after a five-minute rest period, readings being taken on the right arm with the subject seated. Plasma glucose and lipids were quantified in the Portuguese Air Force laboratory using an automated method.

Risk scores

The Framingham online calculator was used to determine the score for 10-year absolute risk of CAD.[5] The HeartScore was calculated using the model for 10-year absolute risk of CV mortality in a low-risk population, based on the following variables: age, gender, SBP, smoking and total cholesterol.[6] In accordance with the latest version of the European Society of Cardiology (ESC) guidelines on cardiovascular disease prevention, the HeartScore was also calculated after inclusion of HDL cholesterol.[8] The Framingham score includes diabetes as well as the above variables.