



The burden of behavioral risk factors for cardiovascular disease in Europe. A significant prevention deficit



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ABSTRACT

Objective. The study objective was to assess the burden of major cardiovascular disease (CVD) behavioral risk factors (BRFs) (i.e., smoking, excess body weight, physical inactivity, risky alcohol consumption) among individuals in the community with and without CVD history.

Methods. For the current study, a subset of the data from the Survey of Health, Ageing and Retirement in Europe (SHARE) was analyzed, which were collected from 26,743 individuals aged 50+ years old, during the 1st wave of SHARE in 2004/05 in eleven European countries.

Results. Among those with CVD, there is a statistically significant higher percentage of inactive individuals (81.4% vs. 69.5 among those without CVD), and of individuals with excess body weight (64.3%) or obese (21.6%). Patients with CVD had a lower prevalence of smoking and risky alcohol consumption in most countries, whereas the prevalence of high body weight and physical inactivity was higher in CVD patients compared to individuals without CVD in almost all countries. More than half of the population has at least two BRFs, with a significantly higher prevalence of multiple BRFs among those diagnosed with CVD.

Conclusion. Study findings suggest that a significant burden of behavioral risk factors for CVD remains in the population overall but also among patients diagnosed with CVD. Given the significant prevalence of BRFs, the prevention benefits would be immense for all stakeholders involved and negligence would be perilous.

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Introduction

Cardiovascular disease (CVD) is the leading cause of death worldwide (Hobbs et al., 2010), is responsible for almost half of all deaths in Europe, and is the main cause of disease burden (Reiner, 2009) despite the fact that several of the major CVD risk factors are well-established, modifiable, and amenable to intervention, such as high blood pressure, elevated cholesterol, obesity, smoking, poor diet, or physical inactivity (Hobbs et al., 2010).

The effect of these CVD risk factors is synergistic, fortifying the effect of each risk factor and resulting in a combined effect that exceeds their additive impact (Graham et al., 2007; Hobbs et al., 2010). Investigators point out that even among patients with established CVD, there are

significant treatment gaps, with patients not reaching suggested goals (e.g., total cholesterol values) or other risk factors present, such as smoking, obesity, might be undermanaged with little improvement. (Hobbs et al., 2010).

Undoubtedly though, modification of CVD risk factors reduces morbidity and mortality, also for those with a history of CVD (Reiner, 2009), who have been selected as a very high priority group for prevention (Graham et al., 2007). Previous studies (EUROASPIRE, 1997; Kotseva et al., 2001) among coronary heart disease (CHD) patients in the late nineties have reported the prevention deficit in this group of patients that still persists, with one in five patients with coronary heart disease still smoking or 30% of them being obese. Such prevention deficit or failure, regardless of the dissemination of repeated updated CVD prevention guidelines, could also in part be explained by the skepticism of practitioners on how to incorporate preventive cardiology care in clinical practice, as well as, politicians' and policy makers' who determine resource allocation to hospital care vs. prevention services (Reiner, 2009).

The study aim was to assess the burden of major behavioral risk factors (BRFs) (i.e., smoking, risky alcohol consumption, excess body weight, physical inactivity) among currently non-hospitalized individuals in the community with and without CVD history; i.e., assess the

Abbreviations: BRFs, Behavioral risk factors; CVD, Cardiovascular disease; CHD, Coronary heart disease; SHARE, Survey of Health, Ageing and Retirement in Europe; BMI, Body mass index; CAPI, Computer-aided personal interviews; OR, Odds ratio; CI, Confidence interval.

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BRFs prevalence and cross-sectional association with CVD among individuals of 50 years old or older in the Survey of Health, Ageing and Retirement in Europe (SHARE Project, 2004/05).

Methods

Participants and data collection

For the current study, a subset of the data from the Survey of Health, Ageing and Retirement in Europe (SHARE, <http://www.shareproject.org>) was analyzed, which were collected from 26,743 individuals aged 50+ years old, during the 1st wave of SHARE in 2004/05 in eleven European countries (Austria, Belgium, Denmark, France, Germany, Greece, Italy, Netherlands, Spain, Sweden, and Switzerland). Based on stratification using the complex sampling design, the selected sample for the current study (26,743 individuals aged 50+ years) corresponds to a target estimated population of 104,871,350 and was selected from 27,444 total participants in the eleven participating countries. Details of the sampling frame and data collection instruments have been described previously (Borsch-Supan and Brugiavini, 2005; Linardakis et al., 2013). Data were collected using computer-aided personal interviews (CAPI); proxy interviews (6% of completed interviews) were allowed when the participant could not complete the interview due to physical or mental limitations. One of the CAPI questions inquired: “Has your doctor told you that you have...,” allowing thereafter 14 choices of diseases and conditions, including myocardial infarction, heart attack, coronary thrombosis, chronic heart failure or other heart disease, stroke or other brain vessels’ disease, high blood pressure or hypertension, high cholesterol levels, and diabetes mellitus, among others. Cardiovascular disease was defined as any choice or the following: myocardial infarction, heart attack, coronary thrombosis, chronic heart failure or other heart disease, stroke or other brain vessels’ disease.

The association of cardiovascular diseases with four health behavior-related risk factors, i.e., excess body weight, smoking habits, physical inactivity, and risky alcohol consumption, were assessed. Excess body weight was assessed by calculating body mass index (BMI, kg/m²) based on self-reported weight (kg) and height (m) measurements (Peytremann-Bridevaux et al., 2007). Individuals were considered to have excess body weight if they were overweight (BMI = 25.0–29.9 kg/m²) or obese (BMI ≥ 30.0 kg/m²) (WHO, 2000). Smoking habits were assessed by a self-reported record of use of cigarettes, cigars, or pipes during the year preceding the survey. Physical inactivity was defined as lack of engagement in moderate-vigorous activities (per week) (Romero-Ortuno et al., 2010). Activities of moderate intensity included gardening, cleaning of the car, or walking whereas activities such as sports or heavy home labor were considered of vigorous intensity. Activity frequency was defined as “more than once per week,” “once per week,” “one to three times per month,” “hardly ever or never.” As the specific time spent in moderate/vigorous activities per week could not be assessed, physical inactivity was estimated using the three last answers on moderate/vigorous activities (Fine et al., 2004; Klein-Geltink et al., 2006). Alcohol consumption was assessed for frequency and period of use (Fine et al., 2004). Risky alcohol consumption was determined as the consumption of 4+ glasses of alcoholic beverages, at least 3 days/week, during the 6 months preceding the survey (Borsch-Supan and Brugiavini, 2005). As household income was defined as the total income from any source (e.g. personal income, pension etc.) during 2003, converted to Euros for countries outside the European Monetary Union, treated with imputations on missing data (Borsch-Supan and Brugiavini, 2005), the 25th, 50th, and 75th percentiles of income by country were calculated.

Statistical analysis

Weights were applied according to the complex sampling design of the study, reflecting non-responses and stratification design, resulting in the estimation also of standardized (weighted for age and sex) prevalence rates. The prevalence of risk factors and cardiovascular disease and the respective 95% confidence intervals (95% CIs) were estimated according to the complex sampling design. Logistic regression models were used to estimate the association between smoking, physical inactivity, excess body weight, risky drinking and CVD in terms of odds ratios (OR) and their respective 95% CIs adjusting also for sex, age (years), education (years), living with partner/spouse, countries as regions (north, central, south), and income level (Model 1) and also high blood pressure or hypertension, high blood cholesterol and diabetes or high blood glucose (Model 2). Models were built separately for each of the four behavioral risk factors and also run simultaneously adjusting for the four

behavioral risk factors in the same model. Estimates did not change appreciably and we chose to present Models 1 and 2 that included all four BRFs simultaneously. All hypothesis testing was conducted assuming a 0.05 significance level and a two-sided alternative hypothesis. Analyses were performed using the SPSS software (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp).

Results

More than half of the study participants in the 2004/05 SHARE Project wave (54.7%) were female, most were living with a spouse or partner, and 11.7% of them were over 80 years of age. The prevalence of heart disease and stroke was 12.0 (95%CI: 11.4, 12.7) and 3.6 (95% CI: 3.3, 4.0), respectively. Overall, 4.3% participants in the total population were considered risky drinkers, 18.1% were current smokers, almost 60% reported increased (excess) body weight, and 70% were inactive. One in three participants (33.3%) reported high blood pressure, one in five (20.2%) reported high blood cholesterol, and approximately one in ten (11.1%) reported diabetes or elevated blood glucose.

Among participants with CVD, there is a statistically significant higher estimated percentage of inactive individuals (81.4% vs. 69.5 among those without CVD) (Table 1), and of individuals with excess body weight (64.3%; BMI ≥ 25 kg) or obese (21.6%). Although the estimated frequency of current smokers is lower among CVD patients, still approximately one in ten CVD patients (12.5%) is a current smoker, with a higher percentage of heavy smokers (40+ pack years) in the CVD group (13.9% among CVD patients vs. 9.6% in participants without CVD).

The prevalence of each of the four behavioral risk factors by country and CVD status is shown in Fig. 1. Patients with CVD had a lower prevalence of smoking and risky alcohol consumption in most countries, whereas the prevalence of high body weight and physical inactivity was higher in CVD patients compared to individuals without CVD in almost all countries. More than half of the population has at least 2 BRFs, with a statistically significant higher prevalence of at least 2 BRFs among those with CVD (Table 2).

When we examined the cross-sectional association of BRFs and CVD adjusting for potential confounders, heavy smokers (40+ pack years), physically inactive and obese individuals were 48% (OR = 1.48, 95% CI: 1.21, 1.82), 49% (OR = 1.49, 95%CI: 1.27, 1.74), and 36% more likely to report CVD compared with never smokers, physically active and healthy-weight individuals, respectively (Table 3, Model 2). Although the estimates did not really change for smoking and physical activity once model adjustment included high blood pressure, high blood cholesterol, and high blood glucose, the estimates for overweight (OR = 1.22, 95% CI: 1.05, 1.41) and obesity (OR = 1.65, 95% CI: 1.38, 1.98) changed significantly toward the null (for overweight (OR = 1.09, 95% CI: 0.94, 1.27) and obesity (OR = 1.36, 95%CI: 1.13, 1.65). Individuals with two or more BRFs were 1.6 times more likely to report CVD compared with individuals without any BRFs (Table 4, Model 2), exhibiting a dose–response relationship with increasing numbers of BRFs.

Discussion

Cardiovascular disease, the major cause of death in Europe, causes significant disability, burden to health care systems and consequently to the economies in Europe (Nichols et al., 2013). Study findings suggest that a significant burden of multiple BRFs for CVD remains in the population overall but also among patients diagnosed with CVD, with 12.5% of CVD patients being current smokers, most of them being obese and inactive.

The study chose to examine the burden of the BRFs both among SHARE participants with and without CVD, as BRFs are often undermanaged (Hobbs et al., 2010) among these patients, as well. All CVD patients, after a diagnosis, an intervention or an acute event,

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