

ORIGINAL INVESTIGATIONS

Low-Risk Diet and Lifestyle Habits in the Primary Prevention of Myocardial Infarction in Men

A Population-Based Prospective Cohort Study

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ABSTRACT

BACKGROUND Adherence to a combination of healthy dietary and lifestyle practices may have an impressive impact on the primary prevention of myocardial infarction (MI).

OBJECTIVES The aim of this study was to examine the benefit of combined low-risk diet and healthy lifestyle practices on the incidence of MI in men.

METHODS The population-based, prospective cohort of Swedish men comprised 45- to 79-year-old men who completed a detailed questionnaire on diet and lifestyle at baseline in 1997. In total, 20,721 men with no history of cancer, cardiovascular disease, diabetes, hypertension, or high cholesterol levels were followed through 2009. Low-risk behavior included 5 factors: a healthy diet (top quintile of Recommended Food Score), moderate alcohol consumption (10 to 30 g/day), no smoking, being physically active (walking/bicycling ≥ 40 min/day and exercising ≥ 1 h/week), and having no abdominal adiposity (waist circumference < 95 cm).

RESULTS During 11 years of follow-up, we ascertained 1,361 incident cases of MI. The low-risk dietary choice together with moderate alcohol consumption was associated with a relative risk of 0.65 (95% confidence interval [CI]: 0.48 to 0.87) compared with men having 0 of 5 low-risk factors. Men having all 5 low-risk factors compared with those with 0 low-risk factors had a relative risk of 0.14 (95% CI: 0.04 to 0.43). This combination of healthy behaviors, present in 1% of the men, could prevent 79% (95% CI: 34% to 93%) of the MI events on the basis of the study population.

CONCLUSIONS Almost 4 of 5 MIs in men may be preventable with a combined low-risk behavior. (J Am Coll Cardiol 2014;64:1299-306) © 2014 by the American College of Cardiology Foundation.

Coronary heart disease (CHD) incidence and mortality have decreased in many areas of the world, yet the burden of disease remains high (1). Although pharmacological therapies

through lipid-lowering (2), and antihypertensive (3) treatments have proved efficacious in reducing coronary events, adherence to a healthy lifestyle still has an impressive impact (4-16). In contrast to drug

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ABBREVIATIONS AND ACRONYMS

CHD = coronary heart disease

CI = confidence interval

CVD = cardiovascular disease

FFQ = food frequency
questionnaire

MI = myocardial infarction

RR = relative risk

therapies, medication-free strategies to help prevent CHD are mostly without the risk of side effects. Because population-wide strategies to shift the entire distribution of risk cannot rely on prescription medication, effective lifestyle-based prevention is essential.

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For CHD incidence, as much as 77% to 82% of the events were attributed to the lack of adherence to a low-risk lifestyle, consisting of 5 healthy diet and lifestyle choices in women (15,16). In American men, the corresponding attributable risk was 62%, and 57% among those men taking medication for hypertension or hypercholesterolemia (13). Yet, there is limited information available on community-based populations, especially in men. Moreover, the impact of lifestyle in the setting of contemporary guidelines and treatments is less well established.

We examined the benefit of a combined healthy diet and lifestyle on the incidence of myocardial infarction (MI) in a large population-based prospective cohort of healthy Swedish men. We estimated the burden of CHD that could potentially have been avoided had all men adhered to the low-risk practice of a healthy diet, moderate alcohol consumption, no smoking, being physically active, and avoiding abdominal adiposity. A separate analysis was performed among men with hypertension and high cholesterol.

METHODS

POPULATION. In the autumn of 1997, all men born between 1918 and 1952 and residing in 2 counties in central Sweden received a questionnaire that included ~350 items concerning diet and other lifestyle factors (response rate was 49% of the source population). This large population-based cohort is representative of Swedish men 45 to 79 years of age in terms of age distribution, educational level, and prevalence of being overweight (17). Of the 48,850 men who returned the questionnaire, we excluded those with an erroneous or a missing national identification number. We further excluded men from the baseline population with a history of cancer (n = 2,592), ischemic heart disease or stroke (n = 5,405) on the basis of computerized linkage to national cancer and patient registries, as well as men with self-reported hypertension (n = 6,768) and self-reported high cholesterol (n = 2,527) and diabetes (n = 3,173) reported from national diabetes and patient registries and self-reports because these diagnoses may have caused a change in diet and lifestyle. Finally, we excluded those with implausible values for total energy intake (i.e.,

3 SDs from the log_e-transformed mean energy intake; n = 329) and those with missing information on any of the 5 diet and lifestyle factors (n = 6,975). After these exclusions, 20,721 men remained for the main analyses. A separate analysis was performed of 7,139 men with hypertension and high cholesterol at baseline and with complete information on all exposure variables. The Regional Ethical Review Board at Karolinska Institutet approved the study, and return of the completed questionnaire was considered to imply informed consent.

ASSESSMENT OF DIET AND LIFESTYLE FACTORS. Diet was assessed using a self-administered semiquantitative food frequency questionnaire (FFQ) including questions on 96 commonly eaten foods. The validity of the FFQ compared with 14 24-h dietary recall interviews with 248 Swedish men 40 to 74 years of age were (mean Spearman correlation coefficient) 0.65 for macronutrients and 0.62 for total micronutrients (including supplements) (18).

A healthy diet was identified according to the Recommended Food Score, developed in 2000 by Kant et al. (4), for the National Health and Nutrition Examination Survey as a simple way to define diet quality by separating “healthy from less healthy” foods, on the basis of current knowledge and dietary guidelines. The Recommended Food Score is highly predictive of mortality (4,19) and includes foods with a beneficial effect on cardiovascular health (1,20,21), such as, fruits, vegetables, legumes, nuts, reduced-fat dairy products, whole grains, and fish. Adapted for our FFQs (19) (later expanded for the FFQ used in the present study [22]), a food score of 1 (adding up to a maximum of 25) was assigned for ≥1 servings per week of any of 3 reduced-fat dairy products, crisp bread, and whole grain bread, whereas for the remaining food items, the consumed frequency was at least 1 to 3 times per month. We considered those who scored in the highest quintile (scores of 23 to 25) of the Recommended Food Score as having a varied healthy diet (low-risk diet) on the basis of a post-hoc analysis (only the top quintile was associated with a statistically significant decreased risk of MI). The non-Recommended Food Score was based on 21 food items including red and processed meat, fried potatoes, solid fats, full-fat cheese, white bread and refined cereals, and various sweet foods (19).

The low-risk alcohol group comprised those men who consumed moderate amounts of alcohol (10 to 30 g/day) (21). We considered smoking status, level of physical activity, and abdominal adiposity as the 3 major modifiable nondietary low-risk factors (21). The information on smoking included details on the number of years since smoking was stopped. Never

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