

Protective Effect of Fruits and Vegetables against Coronary Heart Disease

Joshiyura KJ, Hu FB, Manson JE, et al. The effect of fruit and vegetable intake on risk for coronary heart disease. *Ann Intern Med* 2001;134:1106–14.

Study Overview

Objective. To evaluate the association of fruit and vegetable consumption with risk for coronary heart disease (CHD).

Design. 2 prospective cohort studies, the results of which were combined using pooling methods.

Setting and participants. 84,251 women aged 34 to 59 years from the Nurses' Health Study (registered nurses) who were followed for 14 years, and 42,148 men aged 40 to 75 years from the Health Professionals' follow-up study (dentists, veterinarians, pharmacists, optometrists, osteopaths, and podiatrists), who were followed for 8 years. Exclusion criteria included a previous diagnosis of cardiovascular disease, cancer, diabetes, or incomplete dietary assessment.

Main outcome measures. Incidence of nonfatal myocardial infarction or fatal CHD (1127 cases in women and 1063 cases in men) were assessed by review of medical records by physicians who were blinded to the participants' risk factors and by using the state vital records and the National Death Index or were reported by next of kin or the U.S. Postal Service. Diet was assessed with semiquantitative food-frequency questionnaires.

Main results. After adjustment for standard cardiovascular risk factors, individuals in the highest quintile of fruit and vegetable intake had a relative risk (RR) for CHD of 0.80 (95% confidence interval [CI], 0.69 to 0.93) compared with those in the lowest quintile. Each 1-serving/day increase in fruit or vegetable intake was associated with a 4% lower risk for coronary heart disease (RR, 0.96 [CI, 0.94 to 0.99]; $P = 0.01$, test for trend). Green leafy vegetables (RR with 1-serving/day increase, 0.77 [CI, 0.64 to 0.93]) and vitamin C-rich fruits and vegetables (RR with 1-serving/day increase, 0.94 [CI, 0.88 to 0.99]) contributed the most to the apparent protective effect of total fruit and vegetable intake.

Conclusion. Consumption of fruits and vegetables, particularly green leafy vegetables and vitamin C-rich fruits and

vegetables, appears to have a protective effect against CHD.

Commentary

Joshiyura and colleagues' study could be considered 1 of the best latest additions to a growing body of controversial evidence exploring the association between diet and cardiovascular disease. The positive and modest association coincides with the results of published systematic reviews of observational studies [1,2]. There is to date no published randomized controlled trial evaluating this issue. Nevertheless, the results of this study should be considered cautiously, given the many assumptions that might have an uncertain impact on the effect size (ie, the risk factor was quantified using at least 3 different semiquantitative questionnaires in 2 separate cohorts). Also, the population studied was restricted to health professionals and the results may not be applicable to other groups. The results only achieve statistical significance when the lowest and the highest quintiles are compared; these 2 groups are affected by outliers and may not be comparable to the general population. On the other hand, healthy lifestyle is a major confounding factor when evaluating dietary effect in mortality, especially because observational studies have limited access to all the needed data to account for this problem in a multivariate analysis. The definition of healthy lifestyle is, in itself, a problem when few variables are available to assess it; this study, for example, only evaluates smoking, alcohol intake, use of multivitamins, and vitamin E intake in the analysis. These problems, as well as the intrinsic limitations of observational studies in this area are factors that make it difficult to establish the true association between diet and risk for cardiovascular mortality [3].

Applications for Clinical Practice

The recommendation to increase the consumption of vegetables and fruits, especially green leafy vegetables and fruits rich in vitamin C, is applicable to most of our patients. The optimal daily intake and the magnitude of their protective effects remain unclear. However, considering the potential benefits and the fact that no adverse side effects of high vegetable and

fruit consumption have been described, it would appear that the more fruits and vegetables a patient consumes daily, the better. This last statement could be challenged by the growing concern about the increased use of pesticides and fertilizers, particularly those with newer chemicals, and the limited knowledge of the effect they may have on public health.

– Review by Pedro J. Caraballo, MD

References

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