RESEARCH

Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer: systematic review and dose-response meta-analysis of prospective cohort studies

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Abstract

Objective To examine and quantify the potential dose-response relation between fruit and vegetable consumption and risk of all cause, cardiovascular, and cancer mortality.

Data sources Medline, Embase, and the Cochrane library searched up to 30 August 2013 without language restrictions. Reference lists of retrieved articles.

Study selection Prospective cohort studies that reported risk estimates for all cause, cardiovascular, and cancer mortality by levels of fruit and vegetable consumption.

Data synthesis Random effects models were used to calculate pooled hazard ratios and 95% confidence intervals and to incorporate variation between studies. The linear and non-linear dose-response relations were evaluated with data from categories of fruit and vegetable consumption in each study.

Results Sixteen prospective cohort studies were eligible in this meta-analysis. During follow-up periods ranging from 4.6 to 26 years there were 56 423 deaths (11 512 from cardiovascular disease and 16 817 from cancer) among 833 234 participants. Higher consumption of fruit and vegetables was significantly associated with a lower risk of all cause mortality. Pooled hazard ratios of all cause mortality were 0.95 (95% confidence interval 0.92 to 0.98) for an increment of one serving a day of fruit and vegetables (P=0.001), 0.94 (0.90 to 0.98) for fruit (P=0.002), and 0.95 (0.92 to 0.99) for vegetables (P=0.006). There was a threshold around five servings of fruit and vegetables a day, after which the risk of all cause mortality did not reduce further. A significant inverse association was observed for cardiovascular mortality (hazard ratio for each additional serving a day of fruit and vegetables 0.96, 95% confidence interval 0.92 to 0.99), while higher consumption of fruit and vegetables was not appreciably associated with risk of cancer mortality.

Conclusions This meta-analysis provides further evidence that a higher consumption of fruit and vegetables is associated with a lower risk of all cause mortality, particularly cardiovascular mortality.

Introduction

Increased consumption of fruit and vegetables has been recommended as a key component of a healthy diet for the prevention of chronic diseases.[1][2] Cardiovascular disease and cancer are the two leading causes of death worldwide.[3] Factors that can reduce the occurrence of these important diseases could contribute to important improvements in health and longevity.

In recent years, there has been growing evidence that fruit and vegetable consumption is related to mortality, including mortality from cardiovascular disease and cancer.[4-6] The results, however, are not entirely consistent. While several studies found