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Letters

Fruits, Vegetables, and Hypertensive Disease Mortality

Sharma, Sangita; Kolahdooz, Fariba; Vik, Shelly; Green, Deborah M.; Kolonel, Laurence N.

Author Information

Aboriginal and Global Health, Research Group, Department of Medicine, University of Alberta, Edmonton, Alberta, Canada, gita.sharma@ualberta.ca

Departments of Neurology and Neurosurgery, Neurocritical Care, Boston University School of Medicine, Boston, MA

Cancer Research Center of Hawaii, University of Hawaii, Honolulu, HI

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Studies have assessed adherence to the United States Department of Agriculture (USDA) dietary recommendations and risk of chronic disease,[1,2] but none has examined the degree of adherence in large ethnically diverse populations. We examined sex-specific associations between adherence to the USDA recommendations for fruit and vegetable intake and hypertensive disease mortality.

The Multiethnic Cohort includes men and women 45–75 years of age, representing five ethnic groups living in Hawaii and Los Angeles County between 1993 and 1996. Potential participants were mailed a comprehensive questionnaire with a detailed quantitative food frequency questionnaire and questions on demography, anthropometry, lifestyle factors, and medical history (including stroke and hypertension). Details of the food frequency questionnaire and study design have been reported elsewhere.[3] Institutional Review Board approval was given by the University of Hawaii and University of Southern California.

After excluding 21,760 subjects who were missing data on smoking history or who had implausible diets or implausible/missing anthropometric information, there were 174,888 participants for analysis. We identified deaths from hypertensive disease (International Classification of Diseases, Ninth Edition [ICD-9] codes 401.9–404.9/ICD-10 codes I10, I110, I119–120, I129, I131–32) by linking cohort data with state death files and the US National

Death Index.

Individual vegetable and fruit servings were computed by summing all servings across the appropriate food items on the food frequency questionnaire. Degree of adherence was determined as a percentage, calculated as the daily serving divided by US serving recommendations[4] for appropriate age and calorie intake. Relative risks (RRs) and 95% confidence intervals (95% CIs) were calculated using Cox proportional hazards models with age as the time metric. The exposure variable was examined as both a binary variable (adherent with dietary recommendations versus not) and a categorical variable (based on quintile cut-points for the distribution of adherence for the entire cohort). Ordinal variables representing the median quintile values were tested for linear trends. Person-times were determined from the date of cohort entry to the date of death or end of study (31 December 2001). Models were adjusted for ethnicity, time in study, education, energy intake, smoking, body mass index, physical activity, history of diabetes, intake of other food groups (meat, dairy, and grains), and alcohol intake. Among women, models were additionally adjusted for history of hormone replacement therapy.

After an 8-year follow-up, we identified 188 men and 165 women who died of hypertensive disease. Persons dying of hypertensive diseases were similar to the whole cohort in mean daily energy intakes and percentages of energy from fat, saturated fat, and alcohol, as well as in mean daily serving intakes of vegetable, fruit, meat, dairy, and grains. Compared with all participants, persons dying of hypertensive disease had a higher prevalence of diabetes and hypertension, higher mean pack-years of cigarette smoking, and lower education. Women dying of hypertensive disease were more likely to be overweight.

No associations were observed between adherence to dietary recom men dations for vegetable or fruit intake and hypertensive disease mortality in the analyses based on a binary exposure (Table). In the analysis by quintiles, hypertensive disease mortality among women was reduced for those who most exceeded recommendations for vegetable consumption (for ≥151% adherent compared with <50% adherent: RR = 0.51 [95% CI = 0.27–0.94]; test for trend, P = 0.08). There were no associations between fruit intake and hypertensive disease mortality in either sex.

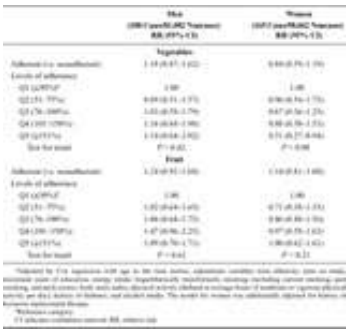

TABLE.

The beneficial effect of high vegetable intake on the risk of fatal hypertensive disease in women is consistent with previous studies.[5,6] The exact mechanisms for this beneficial effect of vegetables are still unknown but might involve nutrients and phytochemicals (which could have independent or joint effects), as well as low dietary glycemic load and energy density.[7] Inconsistent findings between men and women (test for interaction, P = 0.06 for the highest level of vegetable intake) may result from physiological, biochemical, and genetic differences or from differences in food consumption. Future studies may clarify nutritional associations that

were beyond the scope of this study.

Sangita Sharma
Fariba Kolahdooz
Shelly Vik
Aboriginal and Global Health
Research Group
Department of Medicine
University of Alberta
Edmonton, Alberta, Canada
gita.sharma@ualberta.ca
Deborah M. Green
Departments of Neurology and
Neurosurgery
Neurocritical Care
Boston University School of Medicine
Boston, MA
Laurence N. Kolonel
Cancer Research Center of Hawaii
University of Hawaii
Honolulu, HI

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