

## Adopting a Healthy Lifestyle in Middle Age Reduces Later Mortality and Cardiovascular Disease **CME/CE**

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July 10, 2007 — Middle-aged patients who switch to a healthy lifestyle that includes a diet with a daily intake of at least 5 fruits and vegetables, exercise, and other factors have reduced mortality and cardiovascular disease (CVD) during the next 4 years, according to the results of a study published in the July issue of *The American Journal of Medicine*.

"Despite the well known benefits of having a lifestyle that includes exercise, eating a diet high in fruits and vegetables, maintaining a healthy weight, and not smoking, only a small proportion of adults follow this healthy lifestyle pattern," write Dana E. King, MD, MS, from the Medical University of South Carolina in Charleston, and colleagues. "Further characterisation of individuals who adopt a healthy lifestyle in middle-age, and determining the extent of the health benefit would be extremely helpful in formulating appropriate lifestyle advice for such individuals."

The objectives of this study were to determine the proportion of individuals who adopt a 4-element healthy lifestyle ( $\geq 5$  fruits and vegetables daily, regular exercise, body mass index [BMI] of 18.5 - 29.9 kg/m<sup>2</sup>, no current smoking) in a middle-aged cohort and to determine the subsequent rates of CVD and mortality among those who adopt a healthy lifestyle.

The study cohort was a diverse sample of adults aged 45 to 64 years in the Atherosclerosis Risk in Communities (ARIC) survey. Outcome measures were all-cause mortality and fatal or nonfatal CVD.

Of 15,708 participants, 1344 (8.5%) had 4 healthy lifestyle habits at the first visit and 970 (8.4%) of the other participants had newly adopted a healthy lifestyle 6 years later. Factors associated with lower likelihood of adopting a healthy lifestyle were male sex, African-American race, lower socioeconomic status, and a history of hypertension or diabetes (all  $P < .05$ ).

Compared with individuals who did not adopt a healthy lifestyle, those who did had lower total mortality and CVD events during the next 4 years (2.5% vs 4.2%;  $\chi^2 P < .01$  and 11.7% vs 16.5%;  $\chi^2 P < .01$ , respectively). After adjustment, new adopters had lower all-cause mortality (odds ratio [OR], 0.60; 95% confidence interval [CI], 0.39 - 0.92) and fewer CVD events (OR, 0.65; 95% CI, 0.39 - 0.92) in the subsequent 4 years.

"People who newly adopt a healthy lifestyle in middle-age experience a prompt benefit of lower rates of cardiovascular disease and mortality," the authors write. "Strategies to encourage adopting healthy lifestyles should be implemented, especially among people with hypertension, diabetes, or low socio-economic status."

Study limitations include possible misclassification; lack of dietary information regarding fibre, fat, sodium, magnesium, and several other nutrients; food or exercise habits possibly changing between the visits and the outcome assessment; possibly conservative estimates of reduced CVD and mortality; and categorisation being limited to black/non-black in the ARIC study database.

"The potential public health benefit from adopting a healthier lifestyle in middle age is substantial," the authors conclude. "The current study demonstrated that adopting 4 modest healthy habits considerably lowers the risk of cardiovascular disease and mortality in relatively short-term 4-year follow-up period. The findings emphasise that making the necessary changes to adhere to a healthy lifestyle is extremely worthwhile, and that middle-age is not too late to act."

The National Heart, Lung, and Blood Institute in collaboration with the ARIC Study Investigators supported this study.

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## Clinical Context

According to the authors of the current study, several studies have documented the benefits of adopting a healthy lifestyle in reducing all-cause mortality and CVD events and mortality, with estimates of up to a 62% reduction in coronary events in men who maintained a healthy lifestyle for 16 years. However, in the United States, only a small proportion of adults follow a healthy lifestyle pattern that includes consuming a diet high in fruits and vegetables, maintaining a healthy weight, not smoking, and exercising, according to the authors, and the impact of adopting a healthy lifestyle in middle age on mortality and CVD risk has not been well studied.

This is a longitudinal cohort study of community-dwelling adults in 4 US communities to examine the effect of a change in 4 lifestyle habits in middle age on overall mortality and CVD events.

## Study Highlights

- ARIC is a prospective epidemiologic study of 15,792 men and women aged 45 to 64 years from 4 US communities who underwent baseline interview from 1987 to 1989.
- Individuals were followed up with annual telephone calls and 3 visits and then had visits every 3 years.
- Healthy lifestyle was characterised by all 4 of following: eating at least 5 fruits and vegetables daily, exercising (at least walking) a minimum of 2.5 hours per week, maintaining BMI between 18.5 and 30 kg/m<sup>2</sup>, and not smoking.
- A separate group was designated as "optimal lifestyle" if moderate alcohol consumption (1 - 14 drinks/week) was added and BMI was maintained between 18.5 and 24.9 kg/m<sup>2</sup>.
- Dietary questionnaire asked about frequency of consumption of fruits and vegetables, and at least 5 servings daily was considered healthy.
- Top 4 sports and leisure-time activities were identified, and hours of activity summed per week with minutes per week were calculated.
- Those with total of at least 150 minutes per week were categorised as having sufficient exercise.
- Current smokers were identified by self-report on questionnaires.
- Variables were determined by self-report for following: age (45 - 54 and 55 - 64 years), ethnicity (African American and other), education (less than high school, high school or trade school, or college), and family income ( $\leq$  or  $>$  \$35,000).
- Hypertension was defined as systolic blood pressure greater than 139 mm Hg or diastolic blood pressure greater than 89 mm Hg.
- Diabetes was defined by self-report, use of diabetic medications, or fasting blood glucose level greater than 126 mg/dL.
- Hypercholesterolemia was defined by self-reported history, use of medications, or total cholesterol level exceeding 200 mg/dL or low-density lipoprotein cholesterol level exceeding 160 mg/dL.
- CVD was defined by history of myocardial infarction or electrocardiogram data from first visit.
- Status at end of 1998 was determined using state death certificates, and fatal and nonfatal CVD was determined.
- 44% were men, 27% were African American, half were aged 45 to 54 years, 35% had college education, 47% had hypertension, 7.6% had diabetes, 64% had high cholesterol level, and 5% had a history of CVD.
- Of those not practicing all 4 healthy lifestyle habits, 8.4% adopted a lifestyle that included all 4 factors by 6 years after baseline.
- 670 switched from 3 healthy habits, 270 from 2, 26 from 1, and none switched from no healthy habits at baseline.
- Most common change, demonstrated by 78%, was eating at least 5 fruits and vegetables daily, and next most common, by 38%, was increasing exercise to at least 2.5 hours weekly.
- 12.3% adopted smoking cessation, and 4.6% adopted weight loss.
- Those who adopted all 4 healthy lifestyle habits were more likely to be older, women, and more educated and to have higher family incomes and no history of hypertension or diabetes.

- Race, history of diabetes, high cholesterol level, or coronary heart disease was not significantly related to switching to a healthy lifestyle.
  - Fewer than 300 individuals adopted the optimal lifestyle pattern, and no analysis was done for this group.
  - Those who switched to 4 healthy lifestyle habits (vs those with < 4 healthy habits) were less likely to have a subsequent CVD event (11.7% vs 16.5%;  $P < .01$ ) or death (2.5% vs 4.2%;  $P = .009$ ).
  - Those who switched to healthy lifestyle had 40% reduction in all-cause mortality risk (OR, 0.60; 95% CI, 0.39 - 0.92) and 35% reduction in CVD events (OR, 0.65; 95% CI, 0.52 - 0.81) during next 4 years.
  - Those who adopted fewer than 4 healthy habits did not have reduction in CVD but had reduction in total mortality (OR, 0.75; 95% CI, 0.58 - 0.97).
  - Adoption of 4 healthy lifestyle habits in middle age is associated with a 40% reduction in all-cause mortality and 35% reduction in CVD events within 4 years.
  - Those who adopt 4 healthy lifestyle habits in middle age are more likely to be older, women, more educated and to have higher family incomes and no history of hypertension or diabetes.
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