

Walking or vigorous exercise?

Which best helps prevent coronary heart disease in women?

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Research question

Is brisk walking as effective as vigorous exercise in preventing coronary heart disease (CHD) in women?

Type of article and design

Long-term, prospective cohort study.

Relevance to family physicians

A sedentary lifestyle is an independent risk factor for cardiovascular disease. Inactive people have about twice the risk for cardiovascular disease that active people do. Regular exercise can prevent or reduce hypertension¹ and improve dyslipidemia^{1,2} and insulin sensitivity.³ Physical activity can also reduce anxiety and stress.

The Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure currently recommends that all patients be strongly encouraged to follow lifestyle modifications to lower blood pressure and reduce overall risk of cardiovascular disease.⁴ The specific role of walking, the most common form of exercise among women, has not been fully elucidated in reducing the risk of CHD. This study assessed the comparative roles of walking and vigorous exercise in preventing coronary events in a large cohort of women with no history of coronary artery disease enrolled in the prospective Nurse's Health Study.

Overview of study and outcomes

Data in this study were supplied from one arm of the Nurse's Health Study, a large, prospective

cohort study initiated in 1976 with 121 700 female registered nurses 30 to 55 years old as participants. Every 2 years, follow-up questionnaires were sent to the nurses to obtain updated information on potential risk factors and to identify newly diagnosed cases of CHD or other illnesses.

For the study under appraisal, the population included 72 488 female nurses 40 to 65 years old at onset of the study in 1986 (the study excluded women who reported a diagnosis of cancer or CHD at baseline). Detailed information on physical activity was updated in 1988 and 1992.

Using a validated questionnaire, participants were asked to report average time spent per week during the previous year walking or hiking outdoors (including walking to work or during golfing); jogging or running (at speeds lower or higher than 6 min/km, respectively); stationary or mobile bicycling; swimming laps; playing tennis or squash; and doing calisthenics, aerobics, or aerobic dance. In addition, the women were asked about the average number of flights of stairs they climbed in a week.

One MET (metabolic equivalent) is the caloric need per kg of body weight per hour of activity divided by the caloric need per kg per hour at rest. Total physical activity score was expressed as MET-hours per week, calculated as the average time per week spent in each of the eight activities based on standardized MET scores for each exercise.

Physical activity scores were then grouped into quintiles. Weekly MET scores were calculated for total physical activity, vigorous activity (>6 MET/h), nonvigorous activity (<6 MET/h), and walking (2.5 to 4.5 MET/h, depending on pace). Participants reported their usual walking pace as easy or casual (<3.2 km/h), average (3.2 to 4.6 km/h), brisk (4.8 to 6.2 km/h), or very brisk (>6.4 km/h).

Primary end points for this study were coronary events (defined as non-fatal myocardial infarction (MI) or death due to

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CHD) that occurred after return of the 1986 questionnaire and before June 1994. The authors included all confirmed and probable cases of MI in the analyses because results were the same whether probable cases were included or excluded. More than 95% of participants with non-fatal MIs provided follow-up information.

The authors estimated that more than 98% of follow-up information from fatal CHD cases was obtained. Presumed fatal coronary artery disease (no record found with CHD listed as the underlying cause on death certificate) and all cases of sudden death were included because results were identical to those obtained with only confirmed cases of fatal CHD.

The detailed assessment form from 1986 constituted the baseline; the temporal end point of the study was the date of a coronary event or death from any cause or June 1, 1999, whichever came first. The relative risk (RR) of a coronary event was computed as the incidence of the event in each quintile group for MET score divided by the incidence in the lowest quintile group, adjusting for the 5-year age categories.

To examine the association between a change in physical activity and risk of coronary events, the authors related the change between 1980 and 1986 in hours spent engaged in moderate or vigorous activity to coronary events occurring between 1986 and 1994. Potential confounding variables for which the authors adjusted were age; period during the study (four 2-year periods); smoking status; body mass index; alcohol consumption; menopausal status (with or without hormone replacement therapy [HRT] if postmenopausal); diabetes history; dyslipidemia; hypertension; parental MI before age 60; and use of multivitamin supplements, vitamin E supplements, and acetylsalicylic acid.

Results

At baseline, several indicators of CHD risk varied according to quintile for the total physical activity score. More physically active women were less likely to be current smokers and, as expected, were leaner and had a lower prevalence of reported hypertension, diabetes, and hypercholesterolemia than less active women. More physically active women were more likely to use postmenopausal HRT, multivitamin and vitamin E supplements, and alcohol. Activity level was not related to age, parental history of MI, or diet.

The total physical activity score in 1986 was strongly inversely related to risk of coronary events during the 8-year follow up. Risk of coronary events decreased with increasing quintiles for the MET score (RR 0.77, 0.65, 0.54, and 0.46 compared with risk in the lowest quintile;

P for trend was $<.001$). After controlling for possible confounding variables, total physical activity score remained a powerful predictor of subsequent risk of coronary events; RRs for increasing quintiles of physical activity, compared with the lowest quintile, were 0.88, 0.81, 0.74, and 0.66 (P for trend was .002).

The two highest quintiles (10.5 MET-hours per week: the equivalent of >3 h of brisk walking or 1.5 h of vigorous exercise) had a multivariate RR of 0.65 (95% confidence interval .47 to .91) for subsequent coronary events (P for trend was .02). Physical activity was inversely related to risk of coronary events in all strata for smokers (never, previous, and current), for obese and nonobese women, and for those with and without a family history of premature MI. Women who engaged in both walking and vigorous exercise had greater reductions in coronary events than those who participated in either type of activity alone. The authors did not find a greater risk reduction among those who participated in vigorous exercise than among those who walked a similar number of MET-hours per week.

The effect of long-term moderate and vigorous recreational activity (vigorous sports, jogging, bicycling, brisk walking, heavy gardening, heavy housework, and activities "strenuous enough to build up a sweat") showed that averages of 4.0 to 6.9 and 7 or more hours per week spent in these activities were associated with risk reductions of 31% and 37%, respectively, compared with an average of less than 1 hour per week ($P < .001$).

Women who were sedentary (exercised less than once per week) in 1980 (54% of the cohort at that time), who remained sedentary in 1986, had substantially higher rates of coronary events than women who became active. On the other hand, the multivariate risks of coronary events from 1986 to 1994 for women in increasing quintile groups for total physical activity in 1986 were 0.85, 0.79, 0.67, and 0.71, respectively (P for trend was .03).

Analysis of methodology

This was a well-designed, prospective cohort study with many participants and long-term follow up with a high rate of participation in follow up. Primary and secondary analyses were clearly addressed. The authors used a reliable statistical method for simultaneous adjustment for potential confounding variables.⁵ Limitations included use of self-report physical activity questionnaires and, despite accepted control for possible confounding variables, it should be noted that residual confounding might have been present because the more active women had more favourable risk-factor profiles.

Application to clinical practice

Prevention of cardiovascular disease and promotion of health are established goals of the World Health Organization. More than 40 epidemiologic studies have addressed the relation between exercise and coronary disease, but few have included women and presented data on women separately.^{6,7} Prospective data gathered in this study show that both brisk walking and vigorous exercise are associated with substantial reductions in incidence of coronary events among women. The data suggest a causal relation between physical activity and reduced risk of coronary events, and that this risk might be modified through increased activity, even when it is begun later in life.

Such findings lend further support to current recommendations from the Heart and Stroke Foundation of Canada,⁸ which advise aerobic exercise for 30 minutes on most days of the week at moderate intensity. The results of this study suggest that such a regimen (ie, brisk walking for 3 or more hours or vigorous exercise for 1.5 hours weekly) could reduce risk of coronary events by 30% to 40%.

Bottom line

- Vigorous exercise and brisk walking are both associated with substantial and similar reductions in incidence of coronary events among women. This illustrates the importance of primary prevention.
- Brisk walking alone for 3 or more hours weekly is associated with a 30% to 40% reduction of risk of coronary heart disease among women.
- These data are based on following a cohort rather than on a randomized controlled trial.
- Risk of coronary heart disease might be modified through increased activity, even later in life after a lengthy period of inactivity.

- These findings lend further support to current recommendations from the Heart and Stroke Foundation of Canada, which suggest aerobic exercise for 30 minutes on most days of the week at moderate intensity. ♦

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