Methods and Materials

The National Runners' Health Study II and the National Walkers' Health Study were initially recruited in 1998 and 1999 respectively to examine the relationships between various amounts and intensity of physical activity in a large national cohort of 63,308 runners and 42,140 walkers. The original cohorts were partially resurveyed in 2006 to establish a population of approximately 50,000 runners and walkers for a proposed clinical trial, rather than a prospective follow-up study per se [1-3]. These represented approximately a third of the original walker (33.2%), and one-half of the original runner surveyed (51.7%). The difference in recruitment rates was due to the greater effort made to recruit runners (two mailings) than walkers (one mailing). Compared to non-responders, those that responded were slightly more likely to be female, younger, slightly less educated, weighed slightly more, were less likely to report taking medications for blood pressure, hypertension, or diabetes at baseline, but reported approximately the same number of km/day run if a runner or walked if a walker as reported on their baseline questionnaire. The two cohorts may be more accurately characterized as a single cohort that targeted the runners and walkers, since both were recruited over the same approximate time interval, using the same questionnaire (modified slightly for the different activities), using the same sampling domain (subscription lists to running and walking publications, running and walking events), using the same survey staff, and were funded by the same grant.

Participants completed baseline and follow-up questionnaires on height, current weight, diet, current and past cigarette use, and history of diseases. Intakes of meat and fruit were based on the questions "During an average week, how many servings of beef, lamb, or pork do you eat", and "…pieces of fruit do you eat". Alcohol intake was estimated from the corresponding questions for 4-oz (112 mL) glasses of wine, 12-oz (336 mL) bottles of beer, and mixed drinks and liqueurs. Alcohol was computed as 10.8 g/4-oz glass of wine, 13.2 g/12-oz bottle of beer, and 15.1 g/mixed drink. Education was solicited by requesting the participant provide "years of education (examples: HS=12; BS or BA = 16; MS or MA = 18; PhD or MD = 20)." Height and weight were determined by asking the participant, "What is your current height (in inches, without shoes)?" and, "What is your current weight (pre-pregnancy weight if pregnant)?" BMI was calculated as weight in kilograms divided by the square of height in meters. Elsewhere, we have reported the strong correlations between self-reported and clinically measured heights (r=0.96) and weights (r=0.96) [4]. The study protocol was reviewed by the University of California Berkeley committee for the protection of human subjects, and all subjects provided a signed statement of informed consent.

Walking and running were reported in miles per week. In runners, we have reported that the test-retest correlation for self-reported usual distance run per week to be r=0.89 [4], which compares well with other assessments [5]. In addition, the questionnaires asked how many hours per week on average did respondents spend running, walking, swimming, cycling, and in other exercises which they described in detail. They were also asked for their usual pace (minutes per mile) during walking and running. Time based calculations of METh/d of vigorous, moderate, and light exercise were summed as the product of average daily hours spent on each activity and the activity's estimated energy

expenditure [6]. The distance-based calculation of METh/d walked converted distance into duration (i.e., distance/mph) and calculated the average hours walked per day and the MET value for the reported pace [7,8]. Running MET values were calculated as 1.02 MET•h per km [8,9]. Time-based calculation of METh/d run was computed by converting the hours run into distance (i.e., hours*kmph).

New onset or "incident" hypertension, hypercholesterolemia, diabetes, and CHD (myocardial infarction, coronary artery bypass graphs (CABG), percutaneous coronary intervention, and angina pectoris) were defined as physician diagnosis or starting medications for these conditions since the baseline questionnaire. Self-reported hypertension and hypercholesterolemia have been demonstrated as consistent by repeated surveys and reliable as confirmed by medical records [10] and have been used by the Nurses' Health Study [11] and other major cohort studies [12].

Statistical analyses were performed using JMP (SAS institute, Cary NC, version 5.1) and Stata (StataCorp LP, College Station TX, version 11). Cox proportional hazard analyses were used to estimate the hazard rate per METh/d of running, walking, and other vigorous, moderate, and light intensity exercise adjusted for sex, age (age and age^2), race (self-identified Black, Hispanic, Asian, Native American, White), education, smoking (yes, no), and runner vs. walker cohort. The analyses of hypertension, hypercholesterolemia, and diabetes also included adjustment for prior CHD. All analyses were for runners and walkers combined, except where noted (Figures 1 and 2). With 80% power and 5% statistical significance, we should be able to detect a runner vs. walker difference in the hazard rates of 5.0% for hypertension, 3.9% for hypercholesterolemia, 12.1% for diabetes, and 12.1% for CHD.

References for methods

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