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Research paper

Associations of vacation time with lifestyle, long-term mortality and health-related quality of life in old age: The Helsinki Businessmen Study

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ABSTRACT

Introduction: There are few longitudinal studies of relationships between vacation and later health outcomes. We studied these during a 26-year follow-up of the Helsinki Businessmen Study.
Methods: In 1974, at mean age of 47 years, 2741 members of a cohort of executives and businessmen born 1919–1934 were clinically examined and reported their annual vacation time (dichotomized >21 [n = 2001] vs. ≤21 days [n = 740]), self-rated health (SRH) and perceived physical fitness using a five-step scale. In old age in 2000 (mean age 73 years), the survivors filled in the RAND-36/SF-36 health-related quality of life (HRQoL) questionnaire. Mortality between 1974 and 2000 was retrieved from national registers.
Results: At baseline, shorter vacation was associated with longer work time, higher BMI, more coffee consumption and worse SRH. During the 26-year follow-up, 778 men out of 2741 (28.4%) had died. Shorter annual vacation was associated with higher mortality with curves starting to diverge after 18 years of follow-up, (fully adjusted hazard ratio 1.29, 95% confidence interval 1.08–1.55, P = 0.005). In old age, shorter vacation in midlife was tentatively associated with worse general health.
Conclusions: Shorter vacation time in midlife was associated with characteristics related to lifestyle and with worse perceived health status, and predicted mortality up to old age in men.

1. Introduction

Short-term studies of vacation, health, well-being and stress have suggested that – as a recovery process from work – vacation does have positive effects in the individual, but the effects are not large and do not necessarily last long [1–3]. However, vacation is usually a repeating process and cumulative effects may be important during long-term and differ from short-term effects.

In contrast to long working hours [4–6], the associations of vacation with serious health outcomes, such as mortality, have received much less attention. Reflecting this, the search in PubMed with keywords work and mortality produced >20 000 hits, while for vacation and mortality or holiday* and mortality produced less than 500 ones. Moreover, to our knowledge there are only two longitudinal studies about vacation in relation to morbidity or mortality [7,8], their conclusion being that longer vacation time may be good for health. In the large Multiple Risk Factor Intervention Trial (MRFIT [8]), higher frequency of annual vacations of middle-aged men was associated with a reduced risk of premature mortality in a nine-year follow-up. Because the reduction was observed especially for cardiovascular mortality, the mechanism underlying this association may be related to stress-relieving properties of vacation. However, that finding does not confirm cause and effect as men taking more vacation may have intrinsic properties to protect them [8]. Accordingly, it has been reported that there is a connection between less vacation and predisposition to psychosomatic disease [9].

In Finland, annual vacations have been stipulated in law since the 1920s, and in 1973, a four-week vacation was established as a legal right for those with more than 10-year working history in all socioeconomic groups. In other labour market systems,

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socioeconomical status may be related to annual vacation time in that those with lower status have less possibilities to enjoy longer vacations. This is likely to confound the relationships with health outcomes [10]. This type of confounding is smaller in the Nordic countries where everyone is legally entitled to equal rights to vacation annually. This can be further reduced by exploring the associations in a socioeconomically homogeneous population such as the Helsinki Businessmen Study (HBS) cohort [11,12].

We have recently reported that longer working hours coupled with shorter sleep duration in midlife were associated with poorer physical functioning in old age [13]. In the present study we have related annual vacation time in midlife to personal characteristics, including self-rated health (SRH), mortality during a 26-year follow-up, and health-related quality of life (HRQoL) in old age.

2. Methods

2.1. Participants

The HBS cohort (original $n = 3490$) has been described in detail earlier [11–13]. The present analytic subcohort ($n = 2741$) consisted of white men born between 1919 and 1934 (age range 40–55 years), and belonging to the highest social strata with similar socioeconomic and working status. Data on annual vacation time in 1974 (exact work history was not available, but it can be assumed that all participants were eligible for the at least 4-week vacation stipulated by the law), and follow-up outcome data through the year 2000 were available. Of the 2741 men, 2712 (99.1%) reported working at least 30 h per week, and 2203 (80.5%) were clinically healthy (no chronic diseases or regular medications) at baseline. Of the latter, 600 (27.2%) participated in a primary prevention trial between 1974 and 1980 [8]. Details of the various groups in 1974 have been presented in the cohort profile [12]. To control for the possibility that group assignment (clinical status/participation in the trial) would interfere with vacation time and follow-up outcomes, group assignment was adjusted for in the analyses. After 26 years of follow-up in 2000, the survivors ($n = 1983$, mean age 73 years, age range 66 to 81 years) were sent a postal questionnaire. The questionnaire was re-sent once for non-respondents, and in all 1669 (84.2%) men responded. The follow-up of the HBS has been approved by the ethical committee of the Department of Medicine, Helsinki University Central Hospital, and the study is registered as ClinicalTrials.gov identifier: NCT02526082.

2.2. Measures

In 1974 the cohort members were asked what was their annual total vacation time (in days), how many hours per week they work and how many hours they sleep during a week. We did not have information of the number of vacation periods or the timing of these periods, but in the 1970s the bulk of vacation was usually taken in one period during summer months in Finland. Vacation time was dichotomized into shorter ($\leq$21 working days of vacation per year) vs. longer ($>$21 working days of vacation per year). Reason for dichotomizing was that vacation time was skewed (21 days was the cutpoint of lowest quartile) and because annual vacation time was legally stipulated to be four weeks since 1973, three weeks or less of vacation could be considered unusually short among men in the highest social strata. Work and sleep duration were used as continuous variables in the analyses.

In 1974, the cohort members were also asked about current smoking status (yes vs. no), alcohol and coffee consumption, and self-rated health (SRH) and self-rated physical fitness with a Likert-type five-step scale (answering alternatives were very good, fairly good, average, fairly poor and very poor), of which the two latter ones were coded into one category "poor" because only 5 men were in the very poor category [14]). Clinical investigations in 1974 included measurements of cardiovascular disease (CVD) risk factors including current body mass index (BMI) and also recalled weight at age 25 years, as described earlier [8]. Coronary heart disease risk score for hard criteria was calculated according to Keys et al. [15].

2.3. Follow-up 1974–2000

Mortality was comprehensively followed up from the Finnish Population Information System Register Centre through 31 December 2000, and causes of deaths were retrieved from Statistics Finland. According to these registers, the assessment of the vital status is very reliable for people having their permanent place of residence in Finland (over 95% of the present cohort) irrespective whether they die in Finland or abroad. Moreover, the assessment of the vital status is also quite reliable for Finnish citizens living permanently abroad. Causes of deaths were divided in broad categories: coronary, other CVD, cancer, violent (accidents and suicides), and other causes. The postal questionnaire in 2000 included items about social factors (retirement, marriage status), anthropometric measures, medication, and lifestyle factors (e.g. alcohol consumption, smoking). In addition, the Finnish version of the RAND-36-Item Health Survey 1.0 (practically identical to Short Form [SF]-36, and validated in the Finnish population) was embedded into the questionnaire [16]. A comorbidity index was calculated from the responses, taking into account the number and severity of comorbid conditions [17].

The RAND-36 survey, used for assessing HRQoL, comprises eight domains: Physical functioning (PF), Role limitations caused by physical health problems (RP), Role limitations caused by emotional problems (RE), Vitality (VT), Mental health (MH), Social functioning (SF), Bodily pain (BP), and General health (GH). Scores range from zero to 100, with 100 representing the best level of functioning or wellbeing. A difference of three to five points in the RAND-36 domains is considered to be clinically important [18].

A flow chart of the analyses is shown in Fig. 1.

2.4. Statistical analyses

T-tests, nonparametric tests, and analyses of covariance (ANCOVA) were used where appropriate to compare continuous variables (mean with standard deviation [SD]), logarithmic transformation where appropriate) across vacation time groups. Vacation time was highly skewed and the lowest quartile – $\leq$21 working days of vacation – was taken as cutpoint (vacation time was also tested as a continuous variable). Chi-square and trend tests were used to compare proportions. Kaplan–Meier curves and Cox regression analysis with various adjustments (also to emulate those used in MRFIT [8]) were used to assess the relationship between vacation time and mortality during follow-up. Automated stepwise selection procedures were not used. The results are presented as hazard ratios (HR) with their 95% confidence intervals (CI). In statistical analyses two-sided *P*-values are given. The statistical software NCSS (version 2004, www.ncss.com, Kaysville, UT, USA) was used for the statistical analyses.

3. Results

In 1974, 740 men reported having $\leq$21 working days of vacation annually, Table 1 shows clinical and laboratory characteristics according to vacation time. For men in the short vacation time group the average length of annual vacation was less than half of that of the men in the longer vacation time group (14.8 vs. 32.0 days, respectively), and weekly work time was six hours