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The impact of physical activity on sickness absence

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The aim of this study was to examine whether the volume and intensity of physical activity are associated with subsequent sickness absence spells of different lengths, and how much of these associations can be explained by socioeconomic position, body mass index (BMI) and physical health functioning. Baseline data were collected by questionnaire surveys in 2000–2002 among 40–60-year-old employees of Helsinki City (*n* = 6465, 79% women). Sickness absence data were derived from the employer's registers (mean follow-up time 3.9 years). Associations of physical activity with shorter ($\leq$ 14 days) and longer ($>$ 14 days) sickness absence spells were examined, using Poisson's regression analysis. The volume of physical activity was weakly and somewhat inconsistently associated with sickness absence. However, men and women who were vigorously active systematically had reduced risk of sickness absence, whereas the same volume of moderately intensive physical activity did not reduce the risk of sickness absence. Adjusting for BMI and in particular physical health functioning attenuated these associations, after which the associations lost statistical significance. The results suggest that vigorous physical activity is associated with sickness absence and may contribute to better work ability.

There is convincing evidence that regular physical activity has many beneficial health effects, such as enhanced functional ability and reduced risk of major chronic diseases (Kesäniemi et al., 2001; Haskell et al., 2007). According to physical activity recommendations (Fogelholm et al., 2005; Haskell et al., 2007) healthy adults should spend at least about 1000 kcal/week in physical activity, equivalent to brisk walking for 30 min on at least 5 days/week. Such amounts of physical activity are associated with up to a 30% reduction in mortality (Kesäniemi et al., 2001).

Regular physical activity and a balanced caloric intake are needed for successful weight maintenance (Goldberg & King, 2007). In addition to increased energy expenditure, physical activity is important for improved cardiorespiratory and musculo-skeletal fitness. Better cardiorespiratory fitness can be achieved through regular aerobic activity, and musculo-skeletal fitness can be maintained and enhanced by muscle-strengthening exercises (Fogelholm et al., 2005; Haskell et al., 2007). Thus, sufficient intensity of physical activity as well as the total volume may be important for beneficial health effects. However, physical activity may also have adverse health effects due to sports injuries or accidents during commuting (Parkkari et al., 2004).

The health consequences of physical inactivity extend to a broad variety of public health problems, including sickness absence, which is a major economic and work life problem in Finland and in other Western countries (Alexanderson & Norlund, 2004). Previous prospective studies have shown that regular physical activity (Vahtera et al., 1997; Jacobson & Aldana, 2001; Eriksen & Bruusgaard, 2002; van Amelsvoort et al., 2006), sports participation (van den Heuvel et al., 2005; Proper et al., 2006; Jans et al., 2007) and better physical fitness (Kyröläinen et al., 2008) are associated with reduced sickness absence. However, the strength of the association between physical activity and sickness absence may be dependent on individual factors such as age and gender.

A physically inactive way of life may result in decreased functioning even at relatively early age (Huang et al., 1998). Among aging employees, problems in functioning are most often a consequence of chronic illness or disability (Aromaa & Koskinen, 2004). Therefore, those with poor functioning probably have health problems that cause excess sickness absence and restrict their leisure physical activity. In an earlier study (Kivimäki at al., 1997) there was no association between physical activity and sickness absence when baseline health status was taken into account. Obesity and smoking are strong predictors of health problems. Obesity is associated with decreased functioning (Laaksonen et al., 2005) and with sickness absence (Jans et al., 2007; Laaksonen et al., 2008c). However, among those who regularly practise sports obesity does not appear to increase sickness absence (Jans et al., 2007). Smoking decreases physical fitness (Sandvik et al., 1995) and is also associated with sickness absence (Laaksonen et al., 2008c) and therefore is a potentially important confounder. Lower socioeconomic position (SEP) is associated with physical inactivity (Mäkinen et al., 2008) as well as decreased functioning (Lahelma et al., 2005) and increased sickness absence (Piha et al., 2007), and thus might explain the association between physical activity and sickness absence.

The main aim of this study was to examine whether the volume and intensity of physical activity are associated with subsequent shorter ($\leq$ 14 days) and longer ($>$14 days) sickness absence spells over the next 3.9 years. A further aim was to examine whether these associations can be explained by SEP, body mass index (BMI) and physical health functioning. The participants were middle-aged women and men employed by the City of Helsinki.

Material and methods

The baseline data were derived from the Helsinki Health Study questionnaire surveys in 2000, 2001 and 2002. Questionnaires were sent to employees of the City of Helsinki who attained ages of 40, 45, 50, 55 and 60 years during each survey year (Lahelma et al., 2005). The sample consisted of 13 346 persons and 67% returned the questionnaire (7148 women and 1799 men). Younger employees, men and manual workers were slightly under represented among the respondents, but the associations of background variables with sickness absence were similar among both respondents and nonrespondents (Laaksonen et al., 2008a).

The questionnaire data were prospectively linked to the employer's personnel registers, including sickness absence data. In all 5470 women and 1464 men (78%) gave written consent for the linkages. Twenty-three women who reported that they were pregnant were excluded from the study. Respondents who reported any considerably restricting chronic condition or disability were also excluded ($n = 164$). Furthermore, respondents with missing information in any study variables were excluded ($n = 272$). This yielded 5090 women and 1375 men for the present analyses. The study was approved by the ethics committees of the Department of Public Health, University of Helsinki and the health authorities of the City of Helsinki.

Study variables

The respondents were asked their average weekly hours of physical activity during leisure-time or commuting within the previous 12 months in four grades of intensity: walking, brisk walking, jogging and running or equivalent activities. Each intensity grade had five response alternatives, ranging from not at all to more than 4 h/week. The respondents were asked to estimate how many hours per week they spent on average in physical activity corresponding to each grade of intensity.

Total physical activity was converted to an approximate metabolic equivalent (MET) index. The MET value is a multiple of the resting rate of oxygen consumption. One MET is defined as the energy expenditure when sitting quietly. The total MET values per week for physical activity were calculated by multiplying the time used (class midpoints) by the estimated MET value of each physical activity grade (Kujala et al., 1998; Ainsworth et al., 2000) and adding the four values together. We first classified the respondents into quintiles according to the volume of physical activity (MET-hours per week) and then into six groups by taking into account both the intensity and the volume of physical activity: (1) Inactive = Under 14 MET-hours per week, (2) Active moderate = 14–30 MET-hours per week in only moderately intensive activity (walking, brisk walking or equivalent activities), (3) Active vigorous = 14–30 MET-hours per week including vigorous activity (jogging, running or equivalent activities), (4) Very active moderate = 30–50 MET-hours per week in only moderately intensive activity, (5) Very active vigorous = 30–50 MET-hours per week including vigorous activity and (6) Conditioning = over 50 MET-hours per week including vigorous activity.

The number of sickness absence spells during the follow-up was used as the outcome variable (North et al., 1996; Vahtera et al., 1997). We examined separately spells lasting up to 14 days and those lasting $>$14 days (Theorell et al., 2003; Laaksonen et al., 2008b). All consecutive and overlapping sickness absence spells were combined and other absences were removed from the follow-up time. The follow-up began on the day the questionnaire was returned and continued until the end of the year 2005 or until the end of the work contract, providing a mean follow-up time of 3.9 years.

The SEP included four occupational social classes: managers (managerial and administrative work) and professionals (e.g. teachers and doctors), semi-professionals (e.g. nurses and foreman), routine non-manual (e.g. child minders and assistant maids) and manual workers (e.g. transport and cleaning work) (Lahelma et al., 2005). The BMI was calculated as the weight in kilograms divided by the height in metres squared, using questionnaire data. The BMI was categorized into normal weight ($<25\,kg/m^2$), overweight ($25–30\,kg/m^2$) and obese ($>30\,kg/m^2$). Physical health functioning was measured by the physical component summary of the Short-Form (SF36) health questionnaire (Ware et al., 1994) divided into quartiles. Smoking status was classified into two groups: nonsmokers and smokers. Age included five groups: 40, 45, 50, 55 and 60 years. The distributions of these study variables by physical activity are presented in Table 1.

Statistical methods

The sickness absence rates per 100 person-years for shorter ($\leq$ 14 days) and longer ($>$14 days) absence spells were first calculated. The number of sickness absence spells as an outcome effectively uses the information when one individual has several sickness absence spells and it is not dominated by only a few prolonged absences. The associations of physical activity and sickness absence were then examined using Poisson's regression analysis. The rate ratios (RRs) with 95% confidence intervals were calculated, comparing other physical activity categories with the lowest physical activity category. All analyses were performed separately for women and men. The RRs were first adjusted for age and smoking status, and further adjustments were made for SEP, BMI and physical health functioning. Overdispersion was corrected by adjusting the confidence intervals with a scale parameter obtained by dividing the residual deviance by the degrees of freedom. This adjustment increases standard errors and thus widens the confidence intervals but does not affect the point estimates (Gardner et al., 1995). SAS version 8.02 for Windows was used for the analyses (SAS Institute, Chicago, Illinois, USA).

Table 1. Distribution of the study variables by physical activity groups among women and men

	Women						Men					
	Inactive	Active moderate	Active vigorous	Very active moderate	Very active vigorous	Conditioning	Inactive	Active moderate	Active vigorous	Very active moderate	Very active vigorous	Conditioning
N	1200	1472	477	842	560	539	340	268	163	135	213	256
Age (%)												
40	18	17	29	20	24	28	16	13	21	10	19	26
45	21	20	23	21	26	26	17	19	21	21	26	17
50	21	23	21	20	22	22	21	20	25	18	19	21
55	26	26	19	28	21	17	29	28	24	35	23	28
60	14	13	8	12	6	6	17	20	10	16	13	9
Smoking (%)												
No	74	77	82	78	79	81	65	68	76	73	81	86
Yes	26	23	18	22	21	19	35	32	24	27	19	14
SEP (%)												
Manual workers	12	11	7	14	8	11	30	24	22	32	16	29
Routine non-manuals	42	42	35	46	36	38	10	11	8	13	8	7
Semi-professionals	17	12	22	19	22	23	21	22	14	20	21	19
Managers/professionals	30	28	36	20	34	28	40	44	56	35	54	45
BMI (%)												
Normal weight $<25\,kg/m^2$	43	49	65	55	69	75	31	35	43	36	49	48
Overweight 25–30 kg/m^2	33	35	26	34	27	21	44	47	46	49	44	46
Obese $>30\,kg/m^2$	24	16	9	13	4	4	26	18	11	15	7	6
Physical health functioning (%)												
Good	18	20	25	24	31	42	15	25	26	28	36	43
2	22	22	29	24	28	26	24	30	29	27	30	28
3	26	28	27	25	23	19	29	27	28	22	22	19
Poor	34	30	19	27	18	13	32	18	17	23	12	10

Results

We first examined the association for the volume of physical activity with shorter (Fig. 1) and longer (Fig. 2) sickness absence spells. Among men, those with the highest physical activity had fewer shorter-sickness absence spells than those with lowest physical activity, but there were no differences between the intermediate groups. Men in the highest and the middle physical activity quintile had fewer longer-sickness absence spells than men in the other physical activity quintiles. Among women, the volume of physical activity was only weakly associated with shorter and longer sickness absence spells.

We then classified the respondents into six groups, taking into account both the volume and the intensity of physical activity. About one-fourth of the respondents reported physical activity below the minimum recommendations (Table 1). In all, almost half of the women and 30% of the men met the minimum recommendation for moderately intensive activity. About 30% of the women and almost 50% of the men were vigorously active and met the minimum of physical activity recommendations. About 10% of the women and one-fifth of the men were considered as conditioning exercisers.

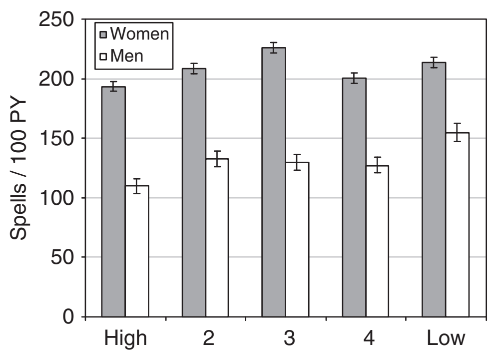

Fig. 1. Number of shorter (≤ 14 days) sickness absence spells per 100 person-years (95% CI) in physical activity volume (MET-hours per week) quintiles by gender.

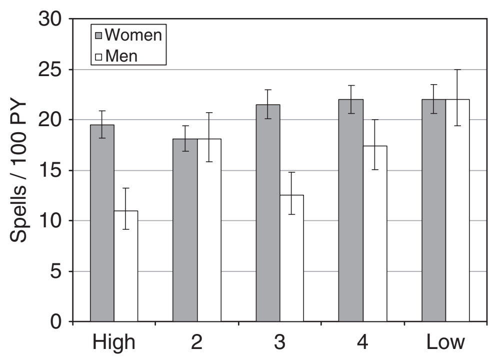

Fig. 2. Number of longer (> 14 days) sickness absence spells per 100 person-years (95% CI) in physical activity volume (MET-hours per week) quintiles by gender.

Among women, the number of shorter sickness absence spells per 100 person-years varied from 182 in the conditioning group to 219 in the very active moderate group (Table 2). Among men, the number of shorter sickness absence spells varied from 110 to 167, respectively. The number of longer absence spells varied from 15 in the conditioning group to 23 in the very active moderate group among women and among men from 11 in the conditioning group to 22 in the inactive group.

Table 3 presents the association of physical activity and sickness absence among women, taking into account both the volume and intensity of physical activity. Women who were vigorously active had slightly reduced risk of shorter sickness absence, whereas the same total volume of moderately intensive physical activity did not affect the risk. Similar patterns were observed in the very active groups; the very active vigorous group had reduced risk of shorter absence but the very active moderate group did not. The conditioning group had the lowest sickness absence rate; the age- and smoking-adjusted risk for shorter sickness absence was 17% lower than in the inactive group. In the longer sickness absences the associations were similar to those in the shorter absences, although stronger: women who were vigorously active had reduced risk of sickness absence, whereas the same total volume of moderately intensive physical activity did not reduce the risk of sickness absence. The conditioning group had 30% lower sickness absence risk than the inactive group. Adjusting for SEP had no effects, but adjusting for BMI and even more physical health functioning attenuated the associations, after which the associations were no more statistically significant.

Among men, as well as women, vigorous physical activity was inversely associated with subsequent sickness absence (Table 4). The very active vigorous group had reduced risk of shorter absences, whereas the very active moderate group had even slightly increased risk of shorter sickness absence. The conditioning group had clearly the lowest sickness absence rate; the relative risk adjusted for age and smoking was 27% lower than in the inactive group. In longer sickness absence spells only the conditioning group had statistically significantly lower sickness absence rate than the inactive group. However, in longer absences the vigorous activity groups also tended to have fewer sickness absences than the moderate physical activity groups with the same total volume, although these results were not statistically significant. Adjusting for SEP and BMI slightly attenuated the associations. Adjusting for physical health functioning more strongly attenuated the associations. After this the conditioning group had 13% lower relative risk for shorter and 33% lower relative risk for longer sickness absences than the inactive group, although these were statistically non-significant.

Table 2. Number of shorter (≤ 14 days) and longer (>14 days) sickness absence spells per 100 person-years and MET-hours per week (range and mean) in physical activity groups by gender

	Men				Women			
	Sickness absence		MET-hours		Sickness absence		MET-hours	
	Shorter	Longer	Range	Mean	Shorter	Longer	Range	Mean
Physical activity								
Inactive	151	22	0–14	7	212	22	0–14	7
Active moderate	126	14	14–30	20	218	22	14–30	20
Active vigorous	127	12	14–30	22	201	17	14–30	22
Very active moderate	167	21	30–50	40	219	23	30–50	41
Very active vigorous	113	16	30–50	39	187	16	30–50	39
Conditioning	110	11	50–165	82	182	15	50–165	74

Table 3. Shorter (≤ 14 days) and longer (>14 days) sickness absence spells by physical activity groups among women

Sickness absence spells	Physical activity					
	Inactive	Active moderate	Active vigorous	Very active moderate	Very active vigorous	Conditioning
Shorter spells						
Age and smoking adjusted	1.00	1.03 (0.95–1.11)	0.92 (0.82–1.02)	1.04 (0.95–1.13)	0.86 (0.77–0.95)	0.83 (0.74–0.92)
SEP*	1.00	1.02 (0.95–1.10)	0.95 (0.85–1.05)	1.00 (0.92–1.09)	0.87 (0.79–0.96)	0.83 (0.75–0.92)
BMI*	1.00	1.06 (0.99–1.14)	0.99 (0.89–1.10)	1.10 (1.01–1.20)	0.94 (0.85–1.05)	0.92 (0.83–1.02)
Physical health functioning*	1.00	1.05 (0.98–1.13)	0.99 (0.89–1.09)	1.09 (1.00–1.18)	0.94 (0.85-–1.03)	0.95 (0.86–1.05)
Longer spells						
Age and smoking adjusted	1.00	1.01 (0.87–1.17)	0.81 (0.64–1.02)	1.07 (0.90–1.27)	0.74 (0.60–0.92)	0.74 (0.59–0.92)
SEP*	1.00	1.00 (0.87–1.15)	0.86 (0.69–1.07)	1.00 (0.85–1.18)	0.77 (0.63–0.95)	0.73 (0.59–0.91)
BMI*	1.00	1.07 (0.93–1.24)	0.91 (0.72–1.14)	1.18 (1.00–1.40)	0.87 (0.70–1.08)	0.88 (0.71–1.11)
Physical health functioning*	1.00	1.07 (0.94–1.23)	0.94 (0.76–1.17)	1.17 (1.01–1.37)	0.88 (0.72–1.08)	0.94 (0.77–1.16)

*Age and smoking adjusted.

Rate ratios (RRs and 95% CI) adjusted for age, smoking, socioeconomic position (SEP), BMI and physical health functioning.

BMI, body mass index; CI, confidence interval.

Table 4. Shorter (≤ 14 days) and longer (>14 days) sickness absence spells by physical activity groups among men

Sickness absence spells	Physical activity					
	Inactive	Active moderate	Active vigorous	Very active moderate	Very active vigorous	Conditioning
Shorter spells						
Age and smoking adjusted	1.00	0.85 (0.70–1.04)	0.82 (0.65–1.04)	1.19 (0.95–1.49)	0.77 (0.62–0.95)	0.73 (0.59–0.90)
SEP*	1.00	0.86 (0.72–1.04)	0.88 (0.71–1.10)	1.12 (0.91–1.39)	0.83 (0.67–1.02)	0.74 (0.61–0.90)
BMI*	1.00	0.88 (0.72–1.06)	0.87 (0.70–1.10)	1.23 (0.98–1.53)	0.83 (0.67–1.03)	0.79 (0.64–0.98)
Physical health functioning*	1.00	0.94 (0.78–1.13)	0.88 (0.71–1.10)	1.27 (1.02–1.58)	0.89 (0.72–1.10)	0.87 (0.71–1.06)
Longer spells						
Age and smoking adjusted	1.00	0.64 (0.39–1.05)	0.58 (0.31–1.10)	0.96 (0.54–1.69)	0.77 (0.46–1.29)	0.53 (0.30–0.93)
SEP*	1.00	0.66 (0.43–1.01)	0.64 (0.37–1.11)	0.90 (0.55–1.46)	0.87 (0.55–1.35)	0.53 (0.33–0.86)
BMI*	1.00	0.67 (0.42–1.07)	0.64 (0.36–1.15)	1.00 (0.59–1.69)	0.88 (0.54–1.42)	0.61 (0.36–1.03)
Physical health functioning*	1.00	0.73 (0.45–1.19)	0.65 (0.35–1.20)	1.05 (0.61–1.81)	0.96 (0.58–1.60)	0.67 (0.39–1.17)

*Age and smoking adjusted.

Rate ratios (RRs and 95% CI) adjusted for age, smoking, socioeconomic position (SEP), BMI and physical health functioning.

BMI, body mass index; CI, confidence interval.

Discussion

This study examined the association of physical activity with subsequent sickness absence spells of different lengths among middle-aged municipal employees. We also examined whether these associations can be explained by SEP, BMI and physical health functioning. The main findings of the study can be summarized as follows:

1. The volume of physical activity was weakly and inconsistently associated with subsequent sickness absence.
2. Those who were vigorously active systematically had reduced risk of subsequent sickness absence, whereas moderately intensive activity with the same volume did not reduce the risk.
3. Conditioning exercisers had the lowest risk of subsequent sickness absence.
4. The associations were similar in both shorter and longer sickness absence spells and among men and women.
5. The association found could partly be explained by SEP, BMI and physical health functioning.

Previous studies have found only relatively weak associations between physical activity and sickness absence (Eriksen & Bruusgaard, 2002; van Amelsvoort et al., 2006). Our study also found relatively weak and inconsistent associations between the volume of physical activity and sickness absence, but after the intensity of physical activity was taken into account, a clear difference was seen between the moderate and vigorous activity groups. One previous study from the Netherlands considered both the volume and intensity of physical activity with regard to sickness absence (Proper et al., 2006), indicating also that vigorous physical activity is associated with reduced sickness absence. In addition, we found that the conditioning group had the fewest sickness spells. Other studies, using various methods, also suggest that vigorous physical activity or sports participation is associated with reduced sickness absence (van den Heuvel et al., 2005; Jans et al., 2007).

There is some indication from previous studies that the association of physical activity and sickness absence may be dependent on the length of the absence (van den Heuvel et al., 2005; Christensen et al., 2007). In the present study the associations were similar in both the shorter and longer absences. The adjustments attenuated the associations quite similarly in the shorter and longer absences. We also examined very short spells (using a cut-off point of 3 days which is the maximum of sick days without a medical certificate), and the associations were nearly the same as in spells of under 15 days (no data shown).

The associations found were quite similar in both genders, although stronger among men. The results suggest that it is important, especially for women, to participate in vigorous physical activity. However, only a third of the women in the present study reported vigorous physical activity, whereas almost half of the men were vigorously active with enough volume.

We also examined whether SEP, BMI and physical health functioning explains the association between physical activity and sickness absence. SEP only slightly explained the associations of the vigorously active groups among men. Some of the associations could be explained by baseline differences in BMI, especially among women. BMI explained about half of the associations found. Among men, BMI only slightly explained the associations. Physical health functioning attenuated the associations even further. Among women, physical health functioning explained about half of the associations found, similar to the situation with BMI in shorter absences. In longer absence spells, two thirds of the associations found were explained by baseline functioning among women. Among men, physical health functioning attenuated the association of the vigorously active group, similar to the situation with previous adjustments. Clearly more physical health functioning attenuated the association of very active vigorous group, explaining about half of the association in shorter spells and almost fully the association in longer spells. Physical health functioning explained about half of the association in shorter spells and about one-fourth in longer spells between the conditioning group and the inactive group.

The reasons why physically active persons have less sickness absence remain partially unknown. Our results suggest that the physically active have better physical health functioning and, partly for this reason, fewer sickness absences. A study undertaken in the Netherlands concluded that the majority of lower sickness absences among the physically active is due to fewer musculo-skeletal disorders (van Amelsvoort et al., 2006), which may hold especially in longer absences. In Finland about two-thirds of the sickness benefit periods, corresponding to longer absences in this study, are due to musculo-skeletal disorders in these age groups (Social Insurance Institution, 2006). Unfortunately, we do not have information on the diagnoses for sickness absence and therefore cannot know the underlying sicknesses or disorders that might explain the differences between physical activity groups.

Among men, those reporting very high volumes of moderately intensive activity were at even higher risk of shorter-sickness absence than their inactive counterparts. These men may have had some health problems and tried to keep fit or improve their health by taking brisk walks or other moderately intensive activities. Similarly, among women those who were moderately active did not have fewer sickness absences than their inactive counterparts. We adjusted for baseline health status by excluding participants who reported any significantly restricting chronic condition or disability. This exclusion slightly attenuated the association, as expected. By adjusting for baseline physical health functioning, the associations were attenuated, which suggests that there were health differences at baseline. However, by adjusting for physical health functioning there is a possibility of over adjustment when the outcome variable is sickness absence, which is likely to reflect functional health.

Among middle-aged and ageing people, walking and brisk walking are the most common forms of physical activity. Moderately intensive activities such as biking to work or walking for pleasure offer health benefits if carried out regularly and often enough (Fogelholm et al., 2005), but our study suggest that this may not necessarily lead to lower sickness absence rates. In a study in Norway on nurses' aides (Eriksen & Bruusgaard, 2002) weekly brisk walks predicted fewer over 14-day sickness absences. In a study in the Netherlands (Proper et al., 2006), those meeting the recommendations for moderately intensive activity did not have fewer sickness absences, similar to the situation in our study.

The association between physical activity and sickness absence might be age related. In previous studies the age distribution has been broad ranging from young to near retirement age employees (Jacobson & Aldana, 2001; Eriksen & Bruusgaard, 2002; van den Heuvel et al., 2005; Proper et al., 2006; van Amelsvoort et al., 2006; Jans et al., 2007; Kyröläinen et al., 2008) and the analyses have not concentrated on specific age groups. In this study, the cohort consisted of 40–60-year-old employees and age was adjusted for in all analyses. Therefore, the results of this study should not be generalized to younger employees.

Working conditions such as the physical strenuousness of work have been in the interest of some previous studies on physical activity and sickness absence (van den Heuvel et al., 2005; Proper et al., 2006), but were not included in this study. While working conditions are potential risk factors for sickness absence, their associations with physical activity are negligible in these data (Lallukka et al., 2004).

The strengths of our study are its register-based data on sickness absence and a prospective design with a relatively large sample of both female and male employees. Information on physical activity at baseline was based on self-reports that may have affected the exact estimation of the true physical activity level. However, quantitative retrospective surveys have been shown to measure physical activity in population studies with sufficient accuracy (Laporte et al., 1985). The proportion of physically inactive persons (under the minimum of current physical activity recommendations) was somewhat lower in our study (about one-fourth inactive) than in the general population in Finland (about one-third inactive) (Fogelholm et al., 2007). This is probably due to the use of different questions and the fact that the majority of participants reported physical activity on the borderline of recommendations. However, the proportional differences may also have been due to this cohort of municipal employees not including people outside working life. The exclusion of participants with chronic conditions slightly affected the proportions. Cross-tabulating physical activity with BMI and physical health functioning confirms that inactivity is clearly more common among the obese, overweight and those with poorer physical health functioning, and also vice versa, i.e. among those with good functioning and normal weight, vigorous physical activity is more common. These findings support the use of our physical activity measure.

Perspectives

The health related consequences of physical inactivity among aging employees have only seldom been studied in Finland or other Western countries. We examined the associations between physical activity and sickness absence using a large prospective dataset and searched for potential explanatory factors for these associations among middle-aged female and male municipal employees. Our study provides novel evidence for the association between physical activity and sickness absence. Our results suggest that those who participate in vigorous physical activity have less sickness absence. However, there are limitations in our study that affect the generalizability of these results. Participants were 40–60 years old public sector employees who are predominantly women. Those with considerably restricting chronic condition or disability were excluded from the study. Furthermore, those who take part in vigorous physical activity may partly be a selected group as regards their baseline health functioning and they may lead an overall healthy lifestyle. In the future, longitudinal studies and randomized intervention trials are needed to find out whether changes can be achieved in physical activity among the less active employees that are large enough to affect sickness absence rates.

Key words: physical activity, sickness absence, functioning, working conditions.

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