

# Does workplace health promotion in Denmark reach relevant target groups?

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## SUMMARY

The aim of the current study was to investigate whether Workplace Health Promotion (WHP) is available for workers with poor health status (overweight, musculoskeletal disorders, sickness absence and poor self-rated health) or health behaviour (smoking, poor diet and sedentarism) and whether they participate in WHP. In total, 9835 workers responded to questions regarding availability to 6 different types of WHP through The Danish Work Environment Cohort Study in 2010. Logistic regression analyses adjusted for age, gender and industry were performed to calculate odds ratios for availability and participation of WHP among groups with different health behaviours and health status. In general, poor health

behaviours were associated with reduced availability of and participation in WHP. In contrast, poor health status was generally associated with higher availability of WHP and increased participation. However, poor self-rated health was associated with lower availability of several types of WHP and reduced participation. In general, workers with health challenges that are visible to others had WHP available, whereas workers with less visible health challenges had WHP less frequently available. Health challenges visible to others were associated with higher participation in WHP, whereas poor health behaviour and reduced self-rated health were associated with reduced participation in WHP programmes.

**Key words:** worksite; participation; non-communicable diseases

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## INTRODUCTION

Unhealthy lifestyle such as sedentarism, poor dietary habits, smoking and alcohol abuse constitute a major public health challenge in the Western society (World Health Organisation, 2002). For example, these four behaviours accounted for approximately 40% of all deaths in the USA in 2000 (Pronk *et al.*, 2010) and it is estimated that 80% of strokes and heart attacks in Europe could be avoided by reducing such behaviours (World Health Organisation, 2002). Thus, unhealthy lifestyles have large economic consequences for society in terms of rehabilitation as well as reduced productivity, sickness absence

and preterm exit from the labour market (Anderson *et al.*, 2000; Christensen *et al.*, 2007).

Therefore, many public health initiatives aim to reach high risk groups in the population, i.e. groups with high prevalence of unhealthy lifestyle or impaired health status. However, a major challenge is that primarily the healthy fraction of the Western population uses public health promotion initiatives (Conrad, 1987; Heaney and English, 1995; Harden *et al.*, 1999; Robroek *et al.*, 2012). One suggestion to facilitate reach of high risk groups is to improve access to health promotion in the environment—the settings approach (World Health Organisation, 1986). Because larger samples of individuals with relatively

similar profiles with regards to socio-economic status, life style, preferences and health cluster at different work sites, workplaces constitute feasible settings to reach individuals normally hard to reach and to tailor the health promotion activities (Jorgensen *et al.*, 2010; Harris *et al.*, 2011). Furthermore, workplace health promotion (WHP) has been widely adopted as a means to improve public health in Western societies (Sorensen *et al.*, 2011). A number of WHP programmes have proven effective for increasing physical activity (Pronk, 2009), weight reduction (Anderson *et al.*, 2009), smoking cessation (Hwang *et al.*, 2012), reduction of musculoskeletal disorders (Andersen *et al.*, 2008; Jorgensen *et al.*, 2011) and even mortality in the long term (Ott *et al.*, 2010).

However, the effectiveness of WHP programmes and their impact on public health largely depend on reach of relevant high risk groups. Despite this, it is unknown if WHP is offered to workers with the highest need for WHP. Furthermore, it is largely unknown if the high risk groups participate, when offered WHP. To our knowledge, only few papers have studied this, as indicated by a review by Robroek *et al.* (Robroek *et al.*, 2009). The review shows no consistent finding for a higher participation from healthy or unhealthy workers and the authors conclude that the lack of studies hampers essential insight for development of tailored WHP programmes. Tailoring of WHP may therefore be hypothesized to a higher degree to depend on immediate visible health challenges (e.g. overweight or smoking) than more discrete health challenges (e.g. elevated blood pressure and poor self-evaluated health). Therefore, to estimate the health prospects of WHP, it is necessary to investigate the availability and participation in WHP among a representative population of workers with varying level of health.

Thus, the aim of the study was to investigate whether WHP directed at individual needs is available to workers in highest need, and if they participate when WHP is available.

## METHODS

In 2010, the latest round of the Danish Work Environment Cohort Study (DWECS) was conducted. DWECS features a random sample of approximately 21 000 employees aged 18–59 years drawn from the Central Population Register of Denmark; of these, 53% (10 605) participated in

the survey. Participants responded to a self-administered questionnaire regarding availability and participation in WHP, health behaviours (smoking, alcohol consumption, fruit and vegetable intake, and leisure time physical activity), health (BMI, musculoskeletal pain, self-rated general health and self-reported sickness absence) and possibilities for influence at work. A total of 9835 employees with information on availability and participation (93%) were included in this study. Sufficient information on all variables were obtained from 7292 to 7794 employees and included in the analyses.

## Variables

### *Workplace health promotion*

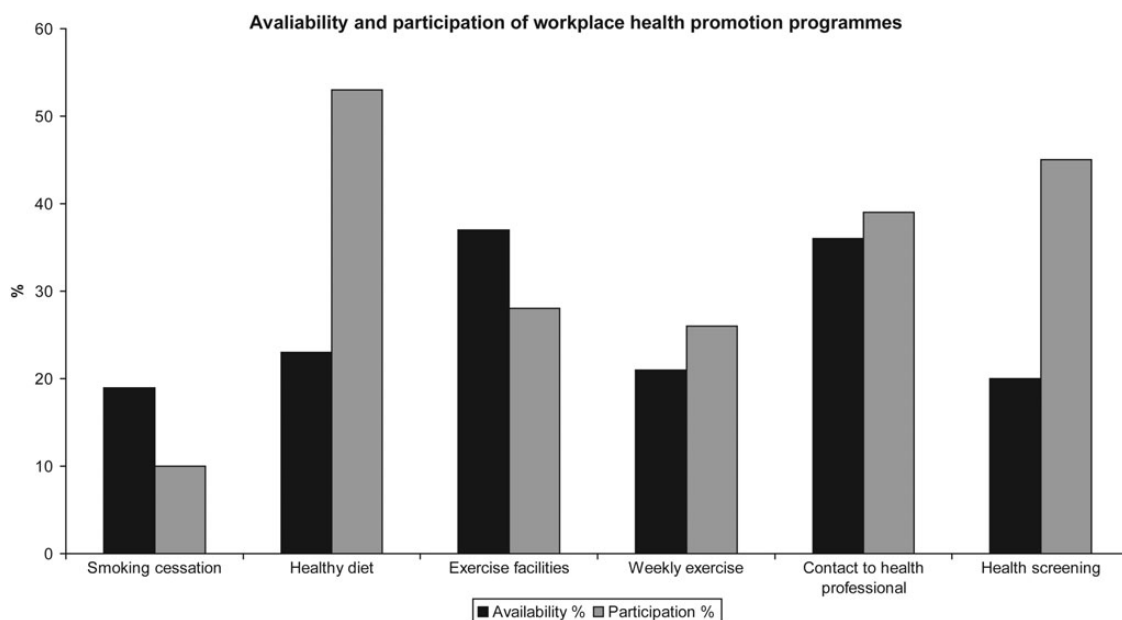
In the current study, WHP entails services delivered by the workplace and directed at the individual needs and lifestyle. Availability to WHP was determined by the question: ‘During the last year, have you been offered health promotion via your workplace?’ The following six types of WHP were requested: Smoking cessation, Healthy diet, Exercise facilities, Weekly exercise classes, Contact to health professionals (physiotherapy, psychologist or the like) and Health screenings. The response categories were ‘No’, ‘Yes, during working hours’ and ‘Yes, outside working hours’. Since point in time was not in focus in this paper, the categories ‘yes, during working hours’ and ‘yes, outside working hours’ were collapsed for the current study. Participation (once or more) in WHP was determined by the question ‘Have you applied it? (If you did, please mark)’.

### *Health behaviours*

*Smoking status* was divided into three categories: smokers, former smokers and non-smokers.

*Fruit and vegetable intake* was measured with the question ‘How often do you eat fruit, salad/uncooked vegetables, boiled vegetables – except for potatoes?’ (At least 3 times daily; twice daily; once daily; 3–6 times weekly; 1–2 times weekly; more seldom) and was categorized into high (2–3 times daily) (reference category), moderate (3–7 times weekly) and low (less than twice weekly).

*Leisure time physical activity* was measured with indications of time used on physical activity at three different intensities by the question: ‘How much time have you spent on each of the



**Fig. 1:** Frequency of availability and participation (among those with availability) in workplace health promotion programmes in a representative sample of Danish wage earners ( $N = 9835$ ).

following leisure time activities during the last year (include also transport to and from work): (1) Walking, biking or other low intensity exercise, in which you don't get short of breath or sweat (i.e. Sunday walks or low intensity gardening)? (2) Exercise training, heavy gardening, or higher intensity walking/biking, in which you sweat and get short of breath? (3) Strenuous exercise training or competitive sports? Response categories were 'above 4 h per week', '2–4 h per week', 'less than 2 h per week' or 'do not execute the activity'. Based on responses to all three activities, participants were categorized into *inactive*, *moderately active* and *highly active*. Individuals that do low intensity activities for less than 2 h/week and no moderate or high activities are defined as *inactive*. Individuals that did low intensity activities for more than 4 h/week, moderate intensity activities for more than 2 h/week and high intensity activities for more than 4 h/week were defined as *highly active*. Responses with any other combinations were defined as moderately active.

#### Health status

**Body Mass Index (BMI)** was calculated by dividing weight in kilograms with squared height in metres and categorized according to standardized

classification of WHO:  $<24.99 \text{ kg/m}^2$  = normal weight (reference category),  $25\text{--}30 \text{ kg/m}^2$  = overweight,  $>30 \text{ kg/m}^2$  = obese.

**Musculoskeletal pain** data were collected by a modified version of the Nordic Questionnaire for the Analyses of Musculoskeletal Symptoms (Kuorinka *et al.*, 1987) with three questions regarding pain in (1) neck and shoulders, (2) hands, forearm or elbow and (3) lower back: 'During the last 12 months, have you had trouble (pain or discomfort) in [body part]?' with answers 'Yes' and 'No'. The variables on musculoskeletal disorders were clustered into three categories according to number of pain regions: No musculoskeletal pain (reference), 1 pain region,  $>1$  pain region.

**Sickness absence** was measured using one question: 'How many workdays in total have you been sickness absent within the last 12 months?' To approximate tertiles, the variable was divided into no sickness absence = 0 days (reference category), medium sickness absence = 1–4 days, high sickness absence =  $>5$  days.

**Self-rated health** was measured by the question 'All in all, how would you rate your health?' (very good; good; moderate; poor; very poor), which was categorized to good (very good/good (reference category)), moderate (moderate) and poor (poor/very poor).

### Covariates

Age and gender were obtained from the Central Population Register and industry from Statistics Denmark's registers. Age was categorized into 18–29 years, 30–39 years, 40–49 years and 50–59 years.

Since previous studies have suggested differences in availability and participation across industries (Hartmann and Traue, 1997; Grosch *et al.*, 1998), data on industry were collected as a covariate. Industry was included in the categories Manufacturing, Graphics, Transportation and Retail, Trading, Service, Agriculture, Social and health care, Teaching and research, Finance/public administration, and Business administration.

It is likely that possibilities for influence at work may influence the possibilities for participating in WHP during working hours, and therefore possibilities for influence at work was measured by the question: 'Do you have large influence on decisions regarding your work' (Always, Often, Sometimes, rarely, never/almost never) recalculated to a 0–100 scale).

### Statistical analyses

Binomial logistic regressions were used to estimate odds ratios for the availability and participation in WHP according to health or health behaviours.

Regression analyses were adjusted for age, gender and industry for the analyses on availability to WHP. The analyses on participation were adjusted for age, gender, industry and possibilities for influence at work. The statistical analysis was performed using the SAS statistical software 9.2 for Windows. An alpha level of 0.05 was accepted as significant.

### Ethics

According to Danish law, research involving questionnaire surveys only should not be reported to the local ethics committee.

## RESULTS

### Availability and participation

Among the respondents, 55% were female and 45% were male with a mean age of 42 years. They were engaged in the following Industries: Manufacturing 15%, Graphics 1%, Transportation

and Retail 10%, Trading 4%, Service 7%, Agriculture 1%, Social and health care 29%, Teaching and Research 11%, Finance/Public Administration 11% and Business Administration 7%. Overall, 60% of the respondents indicated availability of at least one of the six health promotion. Among those, who had WHP available, 50% had participated in at least one of the six health promotion programmes. Figure 1 illustrates overall availability and participation in each of the six programmes.

### Availability

The role of health behaviours and health status as determinants for WHP availability is given in Table 1 in odds ratios and confidence intervals.

### Health behaviours

Smoking behaviour was associated with higher availability of smoking cessation programmes and healthy diet programmes.

Overall low level of physical activity was associated with reduced availability. More specifically among physically inactive workers, healthy diet programmes were less available than among highly active workers. Health screening was available in a dose–response manner with physical activity behaviour—low physical activity was associated with decreased availability. The same was true for weekly exercise and exercise facilities.

Reduced fruit and vegetable intake was associated with reduced availability in all six types of WHP programmes. People with low fruit and vegetable intake had an availability between OR = 0.56 (healthy diet) as the lowest available WHP and OR = 0.73 (health screening) as the highest available WHP compared with people with high fruit and vegetable intake.

### Health status

High BMI was associated with increased availability to smoking cessation [BMI > 30 kg/m<sup>2</sup> (obese)], healthy diet [BMI 25–30 kg/m<sup>2</sup> (overweight)], contact to health professional [BMI > 30 kg/m<sup>2</sup> (obese)] and health screening [BMI 25–30 kg/m<sup>2</sup> (overweight) and > 30 kg/m<sup>2</sup> (obese)]. Availability to the WHP's was elevated with 7–32% in overweight and obese individuals compared with normal weight people.

More musculoskeletal pain regions were associated with increased availability to healthy diet and contact to health professional.

**Table 1:** Availability of six different workplace health promotion programmes among workers with different health behaviours and different health status

Risk profile	Ref	OR (95%CI)	<i>p</i>	OR (95%CI)	<i>p</i>	
<b>Health behaviour</b>						
<b>Smoking</b>						
	<i>N</i>	Non-smoker	Former smoker		Smoker	
Smoking cessation ( <i>N</i> = 7408)	1399	1.0	1.49 (0.99–1.34)	0.07	<b>2.23 (1.92–2.58)</b>	<0.0001
Healthy diet ( <i>N</i> = 7380)	1673	1.0	1.10 (0.96–1.26)	0.16	<b>1.24 (1.07–1.43)</b>	0.0039
Exercise facilities ( <i>N</i> = 7741)	2859	1.0	1.05 (0.94–1.18)	0.37	1.06 (0.93–1.20)	0.36
Weekly exercise ( <i>N</i> = 7292)	1555	1.0	1.04 (0.91–1.20)	0.56	0.99 (0.85–1.16)	0.96
Contact to health professional ( <i>N</i> = 7794)	2854	1.0	1.06 (0.94–1.19)	0.33	1.13 (0.99–1.27)	0.0549
Health screening ( <i>N</i> = 7479)	1458	1.0	0.96 (0.84–1.11)	0.62	1.15 (0.98–1.34)	0.07
<b>Physical activity</b>						
		Highly active	Moderately active		Inactive	
Smoking cessation ( <i>N</i> = 7408)	1399	1.0	0.91 (0.67–1.24)	0.57	0.88 (0.61–1.26)	0.49
Healthy diet ( <i>N</i> = 7380)	1673	1.0	0.84 (0.65–1.09)	0.19	<b>0.68 (0.49–0.94)</b>	0.0201
Exercise facilities ( <i>N</i> = 7741)	2859	1.0	<b>0.77 (0.61–0.97)</b>	0.0293	<b>0.61 (0.46–0.80)</b>	0.0005
Weekly exercise ( <i>N</i> = 7292)	1555	1.0	<b>0.71 (0.54–0.92)</b>	0.0099	<b>0.50 (0.36–0.70)</b>	<0.0001
Contact to health professional ( <i>N</i> = 7794)	2854	1.0	0.89 (0.71–1.13)	0.35	0.80 (0.60–1.06)	0.12
Health screening ( <i>N</i> = 7479)	1458	1.0	<b>0.66 (0.51–0.87)</b>	0.0025	<b>0.52 (0.37–0.72)</b>	<0.0001
<b>Fruit/vegetable intake</b>						
		High	Moderate		Low	
Smoking cessation ( <i>N</i> = 7408)	1399	1.0	0.90 (0.79–1.03)	0.14	<b>0.69 (0.54–0.89)</b>	0.0046
Healthy diet ( <i>N</i> = 7380)	1673	1.0	<b>0.71 (0.63–0.80)</b>	<0.0001	<b>0.56 (0.44–0.71)</b>	<0.0001
Exercise facilities ( <i>N</i> = 7741)	2859	1.0	<b>0.79 (0.71–0.88)</b>	<0.0001	<b>0.63 (0.51–0.77)</b>	<0.0001
Weekly exercise ( <i>N</i> = 7292)	1555	1.0	<b>0.76 (0.67–0.86)</b>	<0.0001	<b>0.59 (0.45–0.76)</b>	<0.0001
Contact to health professional ( <i>N</i> = 7794)	2854	1.0	<b>0.85 (0.77–0.95)</b>	0.0036	<b>0.63 (0.52–0.77)</b>	<0.0001
Health screening ( <i>N</i> = 7479)	1458	1.0	<b>0.86 (0.75–0.98)</b>	0.02	<b>0.73 (0.57–0.93)</b>	0.01
<b>Health status</b>						
<b>BMI kg/m<sup>2</sup></b>						
		<25	25–30		>30	
Smoking cessation ( <i>N</i> = 7408)	1399	1.0	1.13 (0.99–1.29)	0.08	<b>1.21 (1.01–1.47)</b>	0.04
Healthy diet ( <i>N</i> = 7380)	1673	1.0	<b>1.20 (1.06–1.36)</b>	0.0038	1.11 (0.93–1.33)	0.24
Exercise facilities ( <i>N</i> = 7741)	2859	1.0	1.05 (0.94–1.17)	0.41	1.02 (0.87–1.19)	0.84
Weekly exercise ( <i>N</i> = 7292)	1555	1.0	1.04 (0.92–1.19)	0.51	1.17 (0.97–1.40)	0.09
Contact to health professional ( <i>N</i> = 7794)	2854	1.0	1.01 (0.90–1.12)	0.93	<b>1.07 (0.92–1.24)</b>	0.05
Health screening ( <i>N</i> = 7479)	1458	1.0	<b>1.20 (1.05–1.37)</b>	0.0072	<b>1.32 (1.10–1.60)</b>	0.0033
<b>Musculoskeletal disorders</b>						
		None	1 region		≥2 regions	
Smoking cessation ( <i>N</i> = 7408)	1399	1.0	1.16 (0.96–1.40)	0.13	1.01 (0.85–1.20)	0.89
Healthy diet ( <i>N</i> = 7380)	1673	1.0	<b>1.22 (1.02–1.46)</b>	0.0262	<b>1.19 (1.01–1.40)</b>	0.0353
Exercise facilities ( <i>N</i> = 7741)	2859	1.0	1.08 (0.92–1.25)	0.35	1.11 (0.96–1.27)	0.15
Weekly exercise ( <i>N</i> = 7292)	1555	1.0	1.14 (0.95–1.37)	0.16	1.14 (0.97–1.35)	0.12
Contact to health professional ( <i>N</i> = 7794)	2854	1.0	<b>1.22 (1.05–1.42)</b>	0.0108	<b>1.29 (1.13–1.48)</b>	0.0003
Health screening ( <i>N</i> = 7479)	1458	1.0	0.91 (0.76–1.10)	0.34	0.95 (0.80–1.11)	0.51
<b>Self-rated health</b>						
		Good	Moderate		Poor	
Smoking cessation ( <i>N</i> = 7408)	1399	1.0	<b>0.82 (0.69–0.96)</b>	0.0129	0.80 (0.56–1.15)	0.23
Healthy diet ( <i>N</i> = 7380)	1673	1.0	<b>0.82 (0.70–0.95)</b>	0.0103	0.79 (0.56–1.12)	0.18
Exercise facilities ( <i>N</i> = 7741)	2859	1.0	0.92 (0.80–1.05)	0.21	0.76 (0.56–1.02)	0.07
Weekly exercise ( <i>N</i> = 7292)	1555	1.0	<b>0.73 (0.62–0.86)</b>	0.0002	0.84 (0.59–1.20)	0.33
Contact to health professional ( <i>N</i> = 7794)	2854	1.0	0.97 (0.86–1.10)	0.65	0.90 (0.68–1.20)	0.48
Health screening ( <i>N</i> = 7479)	1458	1.0	0.86 (0.73–1.01)	0.07	0.72 (0.49–1.06)	0.09
<b>Sick leave</b>						
		None	1–4 days/year		≥5 days/year	
Smoking cessation ( <i>N</i> = 7408)	1399	1.0	1.09 (0.94–1.27)	0.26	1.13 (0.97–1.32)	0.12
Healthy diet ( <i>N</i> = 7380)	1673	1.0	<b>1.16 (1.02–1.33)</b>	0.0295	1.10 (0.95–1.27)	0.21
Exercise facilities ( <i>N</i> = 7741)	2859	1.0	<b>1.27 (1.13–1.43)</b>	<0.0001	<b>1.22 (1.08–1.39)</b>	0.0017
Weekly exercise ( <i>N</i> = 7292)	1555	1.0	1.12 (0.97–1.30)	0.12	1.13 (0.98–1.32)	0.10
Contact to health professional ( <i>N</i> = 7794)	2854	1.0	<b>1.21 (1.08–1.36)</b>	0.0014	<b>1.15 (1.01–1.30)</b>	0.0305
Health screening ( <i>N</i> = 7479)	1458	1.0	1.09 (0.94–1.26)	0.25	1.05 (0.90–1.22)	0.53

Ref, reference; OR, odds ratio; CI, confidence intervals; *N*, total number of responses included in analysis; *n*, availability. The model is adjusted for age, gender and industry. Significant associations are highlighted (bold).

Moderate and/or poor self-rated health was associated with reduced availability to smoking cessation, healthy diet and weekly exercise.

Sickness absence was associated with increased availability to healthy diet, exercise facilities and contact to health professionals.

### Participation

The role of poor health behaviours and reduced health as determinants for WHP participation is given in Table 2 in odds ratios and confidence intervals.

#### Health behaviour

Naturally, smoking increased participation in smoking cessation both among former smokers (OR = 1.71) and among smokers (OR = 1.89). However, smoking was associated with reduced participation in contact to health professionals and health screening.

Lowered physical activity was associated with reduced participation in exercise facilities and weekly exercise. Among inactive individuals, the participation in weekly exercise programmes was as low as OR 0.17 compared with highly active individuals. Inactivity was also associated with a reduced participation in contact to health professionals programmes.

Reduced fruit and vegetable intake was associated with a reduced participation in healthy diet programmes and exercise facilities programmes.

#### Health status

Overweight (BMI = 25–30 kg/m<sup>2</sup>) was associated with increased participation in weekly exercise programmes.

Increasing musculoskeletal pain was associated with increased participation in contact to health professionals programmes, with OR as high as 2.49 for people with musculoskeletal pain in more than 2 regions.

Moderate self-rated health was associated with reduced participation in weekly exercise programmes.

Sickness absence was associated with increased participation in programmes with exercise facilities and with contact to health professionals.

## DISCUSSION

Two main findings were identified in this study of availability and participation of WHP in a

representative sample of workers in Denmark. First, individuals with musculoskeletal pain, sickness absence, overweight/obesity and smoking habits were more likely to have WHP available and to participate in it. These are health challenges that are either diagnosable or visible and may therefore be easier to tailor WHP activities towards. Second, individuals with less visible health challenges such as reduced self-rated health and poor health behaviours were less likely to have availability of WHP, and these groups were also less likely to participate in WHP.

Poor health status was generally observed to be associated with higher availability of WHP. Health challenges, such as obesity and musculoskeletal pain, as well as sickness absence are well known to be associated with productivity loss and disability (Stewart *et al.*, 2003; Lund *et al.*, 2008; Rodbard *et al.*, 2009). Thus, high availability among risk groups with poor health status may be explained by economic incentives of the employer for offering WHP programmes. This is also illustrated by the type of available WHP (i.e. contact to health professionals, health checks and healthy diet).

Poor self-rated health is a strong determinant for chronic disease and preterm mortality as well as productivity loss and disability, as individuals who rate their health as poor themselves, have elevated risk of those outcomes (Bjørner *et al.*, 1996). However, the workers with lowered self-rated health (moderate or poor) were observed to have a reduced availability to WHP covering three important life style factors, namely smoking cessation, healthy diet and weekly exercise programmes. The reduced availability among the workers with lowered self-rated health may be due to self-rated health might be less noticeable than for example obesity and smoking, and may also be more seldom verbalized. Thus, even though WHP for workers with low self-rated health potentially could impact positively on productivity, the need for WHP may not be recognized. Previously, lack of recognition of early indicators of reduced health has been associated with reduced availability to early rehabilitation (Saltychev *et al.*, 2011). Such lack of recognition leaves important risk groups outside health promotion initiatives and thus maintains the large risk of mortality and production loss in these groups.

A traditional assumption is that health promoting initiatives are less frequently used by persons with poor health (Conrad, 1987). However, this study shows that some indicators of poor health



**Table 2:** Participation in six different workplace health promotion programmes among groups with different health behaviours and different health status

Risk profile		Ref	OR (95% CI)	<i>p</i>	OR (95% CI)	<i>p</i>
<b>Health behaviour</b>						
<b>Smoking</b>						
	<i>n</i>	Non-smoker	Former smoker		Smoker	
Smoking cessation ( <i>N</i> = 1399)	133	1.00	<b>1.71 (1.04–2.79)</b>	0.0329	<b>1.89 (1.19–3.00)</b>	0.0069
Healthy diet ( <i>N</i> = 1673)	899	1.00	1.09 (0.86–1.38)	0.4998	0.89 (0.69–1.14)	0.3586
Exercise facilities ( <i>N</i> = 2859)	813	1.00	1.06 (0.87–1.30)	0.5383	0.93 (0.74–1.17)	0.5303
Weekly exercise ( <i>N</i> = 1555)	398	1.00	0.98 (0.74–1.30)	0.9073	0.78 (0.56–1.09)	0.1507
Contact to health professional ( <i>N</i> = 2854)	1129	1.00	1.08 (0.90–1.30)	0.4264	<b>0.79 (0.64–0.97)</b>	0.0248
Health screening ( <i>N</i> = 1458)	663	1.00	0.98 (0.76–1.26)	0.8702	<b>0.70 (0.53–0.92)</b>	0.0104
<b>Physical activity</b>						
		Highly active	Moderately active		Inactive	
Smoking cessation ( <i>N</i> = 1399)	133	1.00	0.73 (0.31–1.71)	0.4718	0.54 (0.19–1.55)	0.2532
Healthy diet ( <i>N</i> = 1673)	899	1.00	1.15 (0.73–1.80)	0.5511	1.04 (0.58–1.85)	0.9042
Exercise facilities ( <i>N</i> = 2859)	813	1.00	<b>0.51 (0.36–0.72)</b>	0.0001	<b>0.21 (0.12–0.35)</b>	<.0001
Weekly exercise ( <i>N</i> = 1555)	398	1.00	<b>0.46 (0.29–0.73)</b>	0.0011	<b>0.17 (0.08–0.39)</b>	<.0001
Contact to health professional ( <i>N</i> = 2854)	1129	1.00	0.71 (0.48–1.03)	0.0730	<b>0.50 (0.31–0.80)</b>	0.0037
Health screening ( <i>N</i> = 1458)	663	1.00	0.82 (0.52–1.30)	0.4076	0.56 (0.31–1.04)	0.0660
<b>Fruit/vegetable intake</b>						
		High	Moderate		Low	
Smoking cessation ( <i>N</i> = 1399)	133	1.00	1.00 (0.67–1.50)	0.9990	1.17 (0.57–2.43)	0.6690
Healthy diet ( <i>N</i> = 1673)	899	1.00	<b>0.79 (0.63–0.99)</b>	0.0388	<b>0.63 (0.41–0.97)</b>	0.0350
Exercise facilities ( <i>N</i> = 2859)	813	1.00	<b>0.72 (0.60–0.88)</b>	0.0010	0.86 (0.58–1.27)	0.4428
Weekly exercise ( <i>N</i> = 1555)	398	1.00	0.82 (0.62–1.09)	0.1750	1.29 (0.73–2.27)	0.3785
Contact to health professional ( <i>N</i> = 2854)	1129	1.00	0.97 (0.81–1.16)	0.7383	0.70 (0.49–1.01)	0.0570
Health screening ( <i>N</i> = 1458)	663	1.00	0.99 (0.78–1.26)	0.9456	0.75 (0.48–1.20)	0.2297
<b>Health status</b>						
<b>BMI kg/m<sup>2</sup></b>						
		<25	25–30		>30	
Smoking cessation ( <i>N</i> = 1399)	133	1.00	0.88 (0.58–1.33)	0.5479	0.80 (0.45–1.41)	0.4374
Healthy diet ( <i>N</i> = 1673)	899	1.00	0.92 (0.73–1.14)	0.4351	0.92 (0.67–1.27)	0.6119
Exercise facilities ( <i>N</i> = 2859)	813	1.00	1.12 (0.93–1.35)	0.2404	1.25 (0.96–1.64)	0.0956
Weekly exercise ( <i>N</i> = 1555)	398	1.00	<b>1.32 (1.01–1.73)</b>	0.0418	1.01 (0.69–1.49)	0.9273
Contact to health professional ( <i>N</i> = 2854)	1129	1.00	1.02 (0.85–1.21)	0.8691	1.06 (0.83–1.35)	0.6414
Health screening ( <i>N</i> = 1458)	663	1.00	0.89 (0.70–1.12)	0.3127	0.90 (0.65–1.25)	0.5322
<b>Musculoskeletal disorders</b>						
		None	1 region		>/ = 2 regions	
Smoking cessation ( <i>N</i> = 1399)	133	1.00	1.13 (0.63–2.00)	0.6852	0.81 (0.47–1.40)	0.4528
Healthy diet ( <i>N</i> = 1673)	899	1.00	1.22 (0.89–1.68)	0.2141	1.10 (0.83–1.48)	0.4832
Exercise facilities ( <i>N</i> = 2859)	813	1.00	1.10 (0.86–1.40)	0.4674	1.29 (0.99–1.69)	0.0618
Weekly exercise ( <i>N</i> = 1555)	398	1.00	0.80 (0.55–1.16)	0.2355	0.73 (0.52–1.02)	0.0650
Contact to health professional ( <i>N</i> = 2854)	1129	1.00	<b>2.11 (1.58–2.81)</b>	<.0001	<b>2.49 (1.91–3.24)</b>	<.0001
Health screening ( <i>N</i> = 1458)	663	1.00	1.16 (0.83–1.62)	0.3855	1.15 (0.85–1.55)	0.3675
<b>Self-rated health</b>						
		Good	Moderate		Poor	
Smoking cessation ( <i>N</i> = 1399)	133	1.00	1.54 (0.98–2.42)	0.0617	1.93 (0.75–4.98)	0.1738
Healthy diet ( <i>N</i> = 1673)	899	1.00	0.97 (0.74–1.27)	0.8187	1.23 (0.65–2.34)	0.5306
Exercise facilities ( <i>N</i> = 2859)	813	1.00	0.95 (0.76–1.19)	0.6508	0.81 (0.45–1.47)	0.4952
Weekly exercise ( <i>N</i> = 1555)	398	1.00	<b>0.62 (0.42–0.90)</b>	0.0124	0.68 (0.28–1.63)	0.3809
Contact to health professional ( <i>N</i> = 2854)	1129	1.00	<b>1.27 (1.04–1.55)</b>	0.0216	1.34 (0.84–2.14)	0.2180
Health screening ( <i>N</i> = 1458)	663	1.00	0.83 (0.62–1.11)	0.2033	0.96 (0.45–2.02)	0.9054
<b>Sick leave</b>						
		None	1–4 days/year		>/ = 5 days/year	
Smoking cessation ( <i>N</i> = 1399)	133	1.00	0.96 (0.60–1.54)	0.8739	1.11 (0.70–1.78)	0.6378
Healthy diet ( <i>N</i> = 1673)	899	1.00	1.01 (0.86–1.40)	0.4592	1.28 (0.99–1.67)	0.0610
Exercise facilities ( <i>N</i> = 2859)	813	1.00	1.16 (0.94–1.44)	0.1655	<b>1.34 (1.07–1.67)</b>	0.0098
Weekly exercise ( <i>N</i> = 1555)	398	1.00	1.24 (0.92–1.67)	0.1543	1.22 (0.89–1.67)	0.2225

Continued

**Table 2:** *Continued*

Risk profile	Ref	OR (95%CI)	<i>p</i>	OR (95%CI)	<i>p</i>
Contact to health professional ( <i>N</i> = 2854)	1129 1.00	<b>1.40 (1.15–1.71)</b>	0.0008	<b>1.60 (1.30–1.97)</b>	<0.0001
Health screening ( <i>N</i> = 1458)	663 1.00	1.06 (0.82–1.38)	0.6463	0.98 (0.74–1.30)	0.9134

Ref, reference; OR, odds ratio; CI, confidence intervals; *N*, total number of responses included in analysis; *n*, availability. The model is adjusted for age, gender, industry and possibilities for influence at work. Significant associations are highlighted (bold).

were associated with increased participation. Recently, other reports of high WHP participation rates among workers with health challenges have been published (Robroek *et al.*, 2009; Jorgensen *et al.*, 2010) and thus supports that unhealthy workers do use WHP. We observed that moderate self-rated health was associated with reduced participation compared with good self-rated health. Thus, workers with moderate self-rated health have both reduced availability and reduced participation in WHP, although they constitute a serious risk group for chronic disease and disability. Hence, research in how to reach and engage these workers is recommended.

In general, poor health behaviours were associated with reduced availability to WHP. For example, lowered fruit/vegetable intake was associated with reduced availability to all six types of WHP programmes. Low intake of fruit and vegetables has been suggested to be among the top 10 selected risk factors for global mortality (Nishida *et al.*, 2004). Thus, WHP that support healthy diet may be a very important mean for health among workers with low fruit and vegetable intake (Lassen *et al.*, 2007). Lowered leisure time physical activity was associated with reduced availability in exercise facilities, weekly exercise, healthy diet and health screening. It is likely that workers with healthy behaviours more enthusiastically welcome and participate in WHP that support their already established behaviours. For example, the possibility that promoting one health behaviour acts as a gateway to participate in further health promotion has been suggested (Sorensen *et al.*, 2011). Nevertheless, the findings may indicate that lifestyle behaviours such as level of leisure time physical activity and fruit/vegetable intake is not affecting employers' choice of offering WHP and calls for action to reach these groups as well.

Poor health behaviours were associated with reduced participation in WHP. This supports the

traditional notion that healthy workers are more likely to participate in WHP when compared with less healthy workers. For example, workers with moderate compared with high fruit/vegetable intake report lower participation in exercise facilities, physically inactive workers report lower participation in contact to health professionals and smokers report lower participation in contact to health professionals and health screenings. Reasons for low participation rates may come from intra-personal, inter-personal (i.e. social support, networks, cohesion) and institutional influences (Linnan *et al.*, 2001). Intra-personal influences represent i.e. the individual's health beliefs or readiness to change, and inter-personal influences i.e. represent social support, social cohesion or networking. These factors may potentially influence the groups of this study differently; however, also the workers with poor health behaviours may represent job groups with generally lower availability of WHP (Grosch *et al.*, 1998) and perhaps institutional influences that discourage healthy behaviours (Sorensen *et al.*, 2011), such as shift work (Nabe-Nielsen *et al.*, 2011). The background for reduced participation among workers with moderate as well as poor health behaviours needs to be investigated to enable the reach of individuals with poor lifestyle behaviours in future health promotion programmes and early prevention.

### Strengths and limitations

This study was based on data from a large representative sample of workers in Denmark. The prevalence rate of WHP is comparable with studies of WHP prevalence in other countries [i.e. 60% prevalence of any WHP in our study compared with 60% in Germany (Hartmann and Traue, 1997) or 19% prevalence of smoking cessation in our study compared with 18.6% in the USA (Hartmann and Traue, 1997; Linnan *et al.*, 2008)]. The self-reported data in this study



constitute both a strength and a limitation. For example, with regard to availability, the self-reported information is considered a strength. Previous studies on WHP prevalence have often retrieved availability data from the employers. However, to get a true picture of the reach of the employees, employee reports are more accurate. In contrast, self-reported data of participation and health may constitute a limitation of this study (i.e. underestimation of body weight or alcohol consumption). Finally, the cross-sectional design of the study constitutes a limitation with respect to interpretation of causality. For example, associations between physical activity levels and availability to WHP programmes with exercise facilities or weekly exercise may be a result of reciprocal associations. That is, the association may exist due to the availability influencing their level of physical activity instead of vice versa. Similarly, reciprocal associations may exist between fruit/vegetable intake and availability to healthy diet. However, the reduced availability to healthy diet and health screening among workers with low physical activity cannot be explained by reciprocal associations. It could also be argued that reciprocal associations may play a role in the associations between poor health behaviours and reduced participation in WHP. For example, workers may acquire their high physical activity through participation in exercise facilities or weekly exercise offered by the workplace, or high fruit/vegetable intake through use of healthy diet at the workplace. Nevertheless, associations of poor health behaviours and poor participation also exist in WHP programmes that are not directly related to the behaviour.

Finally, this study touches only upon some individual factors that may influence availability and in particular participation. Nevertheless, in a workplace setting particularly inter-personal and structural factors (i.e. workplace resources, work organization or management support) influence the possibilities for WHP availability and participation (i.e. Linnan *et al.*, 2001, 2008). Studying these factors was not within the scope of this article, but deserves comprehensive attention in further studies to fully understand the determinants of availability and participation in WHP.

## CONCLUSION

In general, risk groups with health challenges that are visible to others such as overweight/

obesity, sickness absence and smokers generally had WHP available. However, risk groups with less visible health challenges such as low fruit/vegetable intake and moderate self-rated health had less frequently WHP available. Overall, well-defined health challenges such as overweight, musculoskeletal disorders and sickness absence were associated with higher participation in WHP. However, health challenges such as poor health behaviour (i.e. smoking, physical inactivity, poor fruit/vegetable intake) and reduced self-rated health were associated with reduced participation in WHP programmes.

## FUNDING

The survey was funded by the Ministry of Employment as a part of a surveillance program on occupational health.

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