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SICKNESS ABSENCE IN WORKPLACES: DOES IT REFLECT A HEALTHY HIRE EFFECT?

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Abstract
Objectives: Sickness absence in workplaces may reflect working conditions. It may also reflect a "healthy hire effect," i.e., that workplaces recruit individuals with experience of sickness absence differently. The purpose of the study was to determine if a history of sickness absence among recruits is associated with the average level of sickness absence in workplaces. **Material and Methods:** In a register-based follow-up study, Swedish workplaces with at least 5 employees in 2006 were selected (approximately 127 000 workplaces with 3.9 million employees). The workplaces were categorized according to the average workplace sickness absence in 2006 and the recruits were categorized according to the individual sickness absence in 2005. The workplaces with a high average level of sickness absence were more likely than those with a low level to hire employees with high sickness absence in the year preceding employment: men – odds ratio (OR) = 7.2, 95% confidence interval (CI): 6.6–7.8, women – OR = 7.5, 95% CI: 6.9–8.1. **Results:** The results show that there is a greater likelihood of employing individuals with high levels of sickness absence in the workplaces with many days of the average sickness absence than in the workplaces with few days of the average sickness absence. **Conclusions:** The results suggest that sickness absence in workplaces may reflect a healthy hire effect.

Key words:
Mobility, Vocational rehabilitation, Average sickness absence, Disabled, Sick leave, Healthy worker effect

INTRODUCTION

About 2% of the Swedish population aged 19–64 years, were in 2013 on sick leave lasting 90 days or longer [1]. Financing sickness absence is a considerable economic burden for a society, and most often for an individual, not only in Sweden.

The association between physical and psychosocial conditions at work and sickness absence is well established [2–4]. Sickness absence in a work organization may reflect both health and non-health conditions such as motivation to work [5–7]. Working conditions and leadership have been shown to be associated with both health and motivation among employees [8–11]. From these associations, it is reasonable to conclude that workplaces with low levels of sickness absence have more beneficial working conditions

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and/or leadership than workplaces with higher levels of absence.

Few studies have focused on differences in sickness absences between workplaces and reasons for such differences. One exception is Virtanen et al. [12], who have reported that common determinants of sickness absence such as health, socio-economic characteristics and working conditions, could not explain differences in sickness absence between 4 factories of a food industry company. The authors have proposed differences in moral and cultural communication of sickness absence in local work communities, which they have called "sickness absence habitus," as an explanation for the different levels of sickness absence.

One cultural dimension that may differ between local work communities, not explicitly mentioned by Virtanen et al. [12], is inclination to hire and keep employees with disabilities and an experience of high sick leave. If such proneness differs it may cause a "healthy worker effect" (HWE), which is a well-known phenomenon in occupational epidemiology considered to be a methodological problem causing a selection bias [13]. Originally it meant that an individual must be relatively healthy in order to be employable and both morbidity, and mortality rates in the workforce are usually lower than in the general population [14].

However, HWE is also likely to occur within the workforce. Healthy individuals may be selected to, and unhealthy individuals selected away from, certain occupations and workplaces. To unravel such processes, HWE, itself, has to be studied. One component of the HWE is the "healthy hire effect," meaning that healthy workers are more likely to be hired than others, which implies that unhealthy individuals are less likely than healthy people to be hired in certain occupations and workplaces, or else, that such workplaces are avoided by unhealthy individuals. Another component of the HWE is the "healthy survivor effect," which implies that unhealthy employees are more prone to out-selection, and may be less likely to remain in certain occupations and workplaces [13–15].

A history of high sickness absence may in many cases convey poor health and disabilities. Kay et al. [16] have found that employers in the USA reported lack of awareness of costs and accommodation issues. Concerns about costs were a reason for their reluctance to hire employees with disabilities. In a recent review of studies of employers' attitudes towards workers with disabilities, it has been found that employers showed positive general attitudes towards workers with disabilities but had some reservations concerning hiring workers with certain types of disabilities [17].

The focus of this study was on the healthy hire effect and the differences in the levels of sickness absence among workplaces. Studies of how workplaces differ in terms of recruiting people with different histories of sickness absence are scarce. However, employers have been shown to differ in their reported willingness to hire and keep disabled individuals [18,19]. Studies from the United States indicate that employers from public and social services are more willing to hire disabled people than other services, and that large firms are more likely to hire them, compared to small ones [17,20].

Sickness absence in Sweden, like in most countries of the western world, is higher among women than men [21]. Older age and a low educational level, compared to younger age and a high educational level, are also associated with higher absence rates [21,22]. Workplaces that are female-dominated, and those that have employees who are older and/or have a low level of education, are therefore, more likely to have high average sickness absence figures. We do not know whether these workplaces are also more likely to hire employees with a history of many days of sickness absence.

Aim

Our aim was to study whether the healthy hire effect may contribute to understanding why workplaces differ in

terms of sickness absence levels. The main question to be answered was whether workplaces with high levels of average sickness absence are more likely to recruit employees with recent experience of long sickness absence than the workplaces with low levels of average sickness absence.

MATERIAL AND METHODS

Sample and design

Ethics statement

The study was approved by the Regional Ethical Review Board in Linköping (Registration No. 169-09). A written informed consent was not obtained as the material on the total population is de-identified. Thus, it was not possible to reach the participants. However, we consider it as unnecessary as it would be impossible to identify any of the individuals. In addition, the study did not imply any active participation on the side of the participants.

In this register-based, follow-up study, the sample was selected in 2 steps. First, Swedish workplaces with 5 employees or more in 2006 were chosen, resulting in a total of 127 158 workplaces with 3 926 722 employees being included in the study. The limit of 5 employees was chosen because smaller companies often employ the owner and family members, and this circumstance may affect recruitment strategies. In the next step, the recruits to these workplaces were identified. Employees who had a workplace identification number in 2006 which differed from the one they had in 2005 were defined as recruits. Both those with no workplace identification number in 2005 (N = 446 789) and those who had different identification numbers in 2005 and in 2006 were included.

Eighty-four percent (N = 106 650) of the workplaces that had 5 employees or more in 2006 had recruited at least 1 employee. Of those employed in 2006, 818 824 (21%) had a new workplace identity compared with the year 2005. Of these, 59 709 were employed in the workplaces where all employees had new workplace identification numbers. This indicates that the new workplace identification number was due to a new owner of the company rather than to employees being recruited. Therefore, they were excluded. This left 747 236 (f = 385 369, m = 361 867) employees defined as recruited to a new workplace in 2006.

Data

Workplace

Information on the workplace level was based on the data from administrative registers from the Swedish Tax Agency, to whom employers in Sweden are required to report annually information about salary and workplace identification numbers for all employees. A workplace is defined as any address, property or a group of properties where some sort of economic activity takes place, with at least 1 employee working for it at least 20 h per week. A company can have several workplaces but a workplace can only belong to 1 company. Individuals with a workplace identification number, which is based on salaries paid in November, were defined as employees.

Individual levels of sickness absence

To be eligible for social insurance benefits in Sweden, one must be a resident and/or work in Sweden. In Sweden, an employer pays for the first 2 weeks of sickness absence. This period of so-called sick pay is not officially registered. If the sickness absence continues after 14 days, an individual receives sickness benefit from the Swedish Social Insurance Agency (SSIA). This can be 25%, 50%, 75% or full sickness benefit. In this study, data on sickness benefits paid by the SSIA were used as a measure of sickness absence, which means that those with no days of sickness absence may in fact include those who had been off work for up to 14 days. We have defined 1 day of sickness absence to encompass 1 day with full sickness benefit, or 2 days with 50% or 4 days with 25% benefits. For all the employees, days of sickness absence/year were computed and divided into 3 categories: 0 days of sickness absence; 1–180 days of sickness absence; 181–365 days of sickness absence.

Sickness absence in the workplace

For all the workplaces, the average number of days of sickness benefit paid by the SSIA per employee and year was computed by summing days of sickness benefits for all employees with an identical workplace identification number each year and dividing by the number of employees in the workplace. Days of sickness benefits were defined in the same way as the one mentioned above, so that 1 day of sickness may encompass 1 day on full benefit, as well as 2 on 50% or 4 on 25% benefit. The average sickness absence in the workplaces was divided into the quartiles: 0–4.9 days of average absence/year; 5–9.5 days of average absence/year; 9.6–13.3 days of average absence/year and 13.4 or more days of average absence/year.

Potential confounders

Level of education

For each person registered in Sweden, the highest level of education is recorded each year. Education is classified according to the Swedish Nomenclature of Education (SUN), which is adjusted to the International Standard Classification of Education (ISCED). The Swedish Nomenclature of Education has 6 different educational levels, of which 2 are pre-secondary (education ≤ 9 years), 1 secondary and 3 post-secondary (< 2 years; > 2 years; doctoral). Here individuals were ascribed to 1 of the 3 categories: pre-secondary, secondary and post-secondary education.

Occupation

Each person's occupation is classified according to a Swedish version of the International Standard Classification of Occupations (ISCO) 88 (COM) (ISCO-88) – a European classification of occupations. This European classification is based on combined knowledge of experts in occupational classification with practical considerations for encoding occupational information collected by census and survey techniques. Jobs are grouped into occupations according to the degree of similarity in their constituent tasks and duties. The Swedisch version of the ISCO (ISCO-88) organizes occupations in a hierarchical framework on 4 levels. We have used the most detailed level containing 355 different occupational groups.

Average age in the workplace

Information on employees' age was collected from national registers. The average age in the workplace was calculated as the mean age of those employees who had an identical workplace identification number in November. The average age in the workplaces was divided into the following quartiles: 17.4–36.3, 36.4–41.4, 41.5–45.8, 45.9–64.2.

Number of employees in the workplace

The number of employees in the workplace was used as a measure of the size of a workplace, and was computed by summing individuals with identical workplace identification numbers. The created variable ranged 5–8876 employees. Four categories, based on the European Union (EU) standards, were created: 5–9 employees; 10–49 employees; 50–249 employees; ≥ 250 employees [23].

Educational level in the workplace

Educational level in the workplace was based on each employee's educational level described above. The proportion with the highest educational level of secondary school in each workplace was computed and divided into 3 groups: < 33%, 34–66%, 67–100%.

Sector

Data regarding sector were collected from the Statistics Sweden's Business Register, where all companies are given a sector code based on the sector in society, ownership and juridical form. In this study, 5 categories were derived from the sector codes, i.e., state (both administration and government-owned companies); municipal; county council; private (limited companies and other non-public companies); other (both public and non-public).

Workplace gender composition

Gender composition in the workplace was established by computing the proportion of women in each workplace. Workplaces were divided into 3 groups describing proportion of women in the total workforce: male-dominated (0–40% women); gender-integrated (41–60% women); and female-dominated (61–100% women).

Analysis

In a multinomial logistic regression, the odds ratio (OR) was calculated for a workplace with the high average sickness absence, compared with a workplace with such an absence being low, to hire a recruit with a history of many days of sickness absence. Multinomial logistic regression handles a categorical dependent outcome that has more than 2 levels. Data were analyzed in a crude model and a full model where all potential confounders were included. A 95% confidence interval (CI) was computed for each OR. Separate analyses were performed for male and female recruits. SPSS Statistics version 22 was the applied statistical program package.

RESULTS

Among the recruits to the workplaces that had the highest average sickness absence levels in 2006 (≥ 13.4 days/year), 4% of both female and male recruits had been on sick leave exceeding 180 days the year before they were recruited (Table 1). For the workplaces that had the lowest sickness absence (0–4.9 days/year), only 1% of both male and female recruits had absence exceeding 180 days.

Among those recruited to a new workplace in 2006, 40% of males were recruited to the workplaces with the lowest average sickness absence (0–4.9 days), as compared with 27% for women (Table 2). Reversed proportions occurred for recruits to the workplaces with the highest average sickness absence (13.4–365 days). Twenty-three percent of males and 36% of females were hired in the workplaces with the highest average sickness absence.

Proportions of those recruited to workplaces with different average sickness absence are similar between educational groups. The biggest difference was found among the recruits to the workplaces with the highest average sickness absence, where 32% of the recruits belonged to the lowest educational group and 27% to the highest.

The older the age of the recruits, the greater the proportion of those recruited to the workplaces with the highest average sickness absence. Thirty-seven percent of the recruits aged 60–66 years were recruited to those workplaces, compared with 25% of the recruits aged 16–20 year.

Recruitment to a workplace with a low average age in 2006 coincided with being hired in a workplace with

Table 1. Recruits with different histories of sickness absence in 2005 with respect to the average sickness absence in the workplaces they were recruited to in 2006

Sickness absence in the workplaces in 2006 (M)	Recruits absence due to illness in 2005						
	women (N = 385 369) [n (%)]			men (N = 361 867) [n (%)]			total (N = 747 236) [n]
	0 days	1–180 days	≥ 181 days	0 days	1–180 days	≥ 181 days	
0–4.9 days/year	86 898 (91)	8 168 (9)	1 622 (1)	125 877 (94)	6 842 (5)	709 (1)	229 116
5–9.5 days/year	72 975 (88)	8 878 (11)	1 256 (2)	86 885 (93)	5 630 (6)	976 (1)	176 600
9.6–13.3 days/year	60 340 (86)	8 530 (12)	1 514 (2)	50 061 (92)	3 810 (7)	853 (2)	125 108
≥ 13.4 days/year	110 936 (82)	19 300 (14)	5 952 (4)	70 202 (88)	7 184 (9)	2 838 (4)	216 412

M – mean.

Table 2. Recruits in 2006 with a different average sickness absence in relation to an individual[1] and workplace characteristics

Variable	Recruits absence due to illness in 2006 (N = 757 918) [n (%)] (M)			
	0–4.9 days/year	5–9.5 days/year	9.6–13.3 days/year	≥ 13.4 days/year
Individual				
gender				
male	147 860 (40)	83 904 (23)	53 111 (14)	83 876 (23)
female	105 715 (27)	75 353 (19)	66 721 (17)	141 378 (36)
education				
pre-secondary	31 775 (34)	17 452 (19)	13 610 (15)	29 824 (32)
secondary	121 055 (34)	71 782 (20)	54 081 (15)	112 324 (31)
post-secondary	97 663 (33)	68 604 (23)	51 256 (17)	81 372 (27)
age [years]				
60–66	6 963 (27)	4 834 (19)	4 359 (17)	9 504 (37)
50–59	25 180 (26)	19 550 (20)	17 047 (17)	35 993 (37)
40–49	40 456 (29)	28 883 (21)	22 404 (16)	45 955 (33)
30–39	64 069 (34)	41 027 (22)	29 004 (16)	52 714 (28)
20–29	93 046 (37)	52 886 (21)	38 187 (15)	66 356 (27)
16–20	23 861 (40)	12 077 (20)	8 831 (15)	14 732 (25)
Workplace				
average age in the workplace [quartile (range)]				
1 (17.4–36.3)	103 483 (53)	38 613 (20)	20 269 (10)	34 794 (18)
2 (36.4–41.4)	65 995 (36)	38 372 (21)	27 647 (15)	53 054 (29)
3 (41.5–45.8)	52 294 (23)	50 575 (22)	44 180 (19)	80 325 (35)
4 (45.9–64.2)	31 803 (22)	31 697 (21)	27 736 (19)	56 999 (39)
employees [n]				
5–9	54 781 (65)	6 424 (8)	3 586 (4)	19 604 (23)
10–49	123 695 (44)	45 262 (16)	30 119 (11)	82 939 (29)
50–249	54 489 (21)	66 034 (26)	48 246 (19)	89 124 (35)
≥ 250	20 610 (15)	41 537 (31)	37 881 (28)	33 587 (25)
proportion with no more than secondary school [%]				
< 33	55 224 (36)	34 134 (23)	26 689 (18)	35 635 (24)
34–66	57 558 (31)	45 971 (24)	28 765 (15)	55 972 (30)
67–100	132 253 (34)	75 846 (19)	59 030 (15)	127 872 (32)

Table 2. Recruits in 2006 with a different average sickness absence in relation to an individual[1] and workplace characteristics – cont.

Variable	Recruits absence due to illness in 2006 (N = 757 918) [n (%)] (M)			
	0–4.9 days/year	5–9.5 days/year	9.6–13.3 days/year	≥ 13.4 days/year
Workplace – cont.				
sector				
state	19 522 (27)	22 980 (32)	13 540 (19)	16 911 (23)
municipal	22 031 (13)	28 613 (17)	29 222 (17)	89 843 (53)
county council	1 607 (4)	2 985 (7)	16 557 (40)	19 792 (48)
private	199 608 (45)	99 077 (22)	55 548 (13)	87 573 (20)
other	10 807 (33)	5 602 (17)	4 965 (15)	11 135 (34)
gender composition				
male-dominated	138 121 (47)	66 460 (22)	37 812 (13)	54 510 (18)
gender-integrated	48 260 (37)	36 550 (28)	18 331 (14)	26 979 (21)
female-dominated	65 256 (20)	53 455 (17)	61 847 (19)	141 955 (44)

[1] Occupation which is used as a confounder with 355 categories is not shown here.
N – recruits; M – mean.

low sickness absence and *vice versa*. Thirty-nine percent of the recruits to the workplaces with the "oldest" employees and 18% of the recruits to those with the "youngest" were recruited to the workplaces with the highest average sickness absence.

Recruitment to a small workplace (5–9 employees) in 2006 concurred with being hired in a workplace with low average sickness absence. Recruitment to bigger workplaces concurred with being hired in the workplaces with medium or high average sickness absence.

Recruitment to the workplaces with different educational levels did not coincide with the average sickness absence levels in a clear-cut way. However, a higher proportion of those recruited to the workplaces with the highest average sickness absence were recruited to the workplaces where there was a high share of employees with a low level of education.

A larger proportion of the recruits to the municipal sector (53%) and county council (48%) were hired in the workplaces with the highest average sickness absence, as compared with only 20% for those recruited to the private sector.

Only 18% of those recruited to the male-dominated workplaces and 21% of the recruits to the gender-integrated workplaces were hired in the workplaces with the highest sickness absence. More than twice as many recruits to the female-dominated workplaces (44%) were hired in the workplaces with high average sickness absence.

Due to the fact that there was a larger proportion of female recruits with sickness absence of 1–180 days, a larger proportion of the male recruits had no days of sickness absence the year before recruitment (92% for men vs. 86% for women) (Table 3). The proportions of men and women with more than 180 days of sickness absence were similar. Among the recruits with the lowest education (pre-secondary), there was a slightly larger proportion of those with sickness absence of more than 180 days, and a smaller proportion of those who had no days of

sickness absence, compared with the recruits with the highest education (post-secondary). Among the recruits aged 20 years or younger, 100% had no days of sickness absence the year before the recruitment, and among the recruits aged 20–29 years the figure was 94%. The proportions with different sickness absence were similar for the recruits in the other age groups.

The higher the average age in the workplace, the lower the proportion with no sickness absence among the recruits. Four percent of the recruits to the workplaces with the "oldest" employees had sickness absence days exceeding 180 days the year before the recruitment, as compared with 1% for the workplaces with the "youngest" employees. Size and educational level in the workplace did not differ with regard to proportions of the recruits with low and high sickness absence.

Workplaces in the municipal sector had the highest proportion of the recruits who had many days of sickness absence the year before the recruitment. Thirteen percent of recruits in this sector had 1–180 days of sickness absence the year preceding the recruitment and 3% had > 180 days. Comparable figures for the workplaces in the private sectors, which had the lowest proportions of recruits with experience of sickness absence, were 8% (1–180 days) and 2% (181–365). Compared with the male-dominated and gender-integrated workplaces, the female-dominated workplaces had a slightly higher proportion of recruits with 1–180 days of sickness absence the year before the recruitment and a lower proportion with no sickness absence.

The logistic regression analysis showed a dose-response relationship between the average sickness absence in the workplace and the proportion of recruits with sickness absence the year before the recruitment (Table 4). Compared with the workplaces with the fewest days of average sickness absence, the workplaces with the most days of the average sickness absence had a significantly higher likelihood of recruiting an employee with experience of both 1–180 days and > 180 days of sickness absence.

For recruitment of a female employee with > 180 days of absence the previous year, in the workplaces with the highest average days of sickness absence (≥ 13.4), compared with the workplaces with the fewest average days (0–4.9 days), the crude OR was 7.5 (95% CI: 6.9–8.1), and for recruiting a male the figure was 7.2 (95% CI: 6.6–7.8) (Table 4). The crude OR for these workplaces to recruit a female or male employee who had 1–180 days of sickness absence the previous year was 1.9 (95% CI: 1.8–1.9). The associations remained the same when controlling for potential confounders.

Table 3. Recruits in 2006 with different histories of sickness absence in 2005 in relation to an individual[1] and workplace characteristics

Variable	Recruits absence due to illness in 2005 (N = 747 256) [n (%)]		
	0 days	1–180 days	≥ 181 days
Individual			
gender			
male	333 036 (92)	23 467 (6.5)	5 376 (1.5)
female	331 155 (86)	44 877 (12)	9 345 (2)
education			
pre-secondary	79 408 (88)	8 699 (10)	2 435 (3)
secondary	312 874 (87)	36 924 (10)	8 296 (2)
post-secondary	268 849 (91)	22 648 (8)	3 980 (1)

Table 3. Recruits in 2006 with different histories of sickness absence in 2005 in relation to an individual[1] and workplace characteristics – cont.

Variable	Recruits absence due to illness in 2005 (N = 747 256) [n (%)]		
	0 days	1–180 days	≥ 181 days
Individual – cont.			
age [years]			
16–20	57 519 (100)	61 (0)	1 (0)
20–29	233 161 (94)	12 583 (5)	1 420 (1)
30–39	158 687 (87)	20 979 (11)	3 753 (2)
40–49	114 034 (84)	17 504 (13)	4 674 (3)
50–59	79 365 (82)	13 894 (14)	4 014 (4)
60–66	21 425 (84)	3 323 (13)	859 (3)
Workplace			
average age in the workplace [quartile (range)]			
1 (17.4–36.3)	93 (212 775)	7 (15 010)	1 (1 331)
2 (36.4–41.4)	91 (159 860)	8 (14 509)	1 (2 232)
3 (41.5–45.8)	88 (110 401)	10 (12 340)	2 (2 367)
4 (45.9–64.2)	84 (181 138)	12 (26 484)	4 (8 790)
employees [n]			
5–9	89 (73 410)	9 (7 464)	2 (2 026)
10–49	89 (246 540)	9 (25 689)	2 (5 645)
50–249	88 (225 277)	10 (24 518)	2 (5 097)
≥ 250	90 (118 964)	8 (10 673)	2 (1 953)
proportion with no more than secondary school [%]			
< 33	90 (133 803)	9 (13 083)	2 (2 377)
34–66	89 (164 650)	9 (17 176)	2 (3 583)
67–100	89 (345 787)	9 (35 925)	2 (8 292)
sector			
state	89 (64 842)	9 (6 390)	2 (1 275)
municipal	85 (143 124)	13 (21 658)	3 (4 516)
county council	87 (34 908)	11 (4 515)	2 (827)
private	91 (393 544)	8 (32 543)	2 (7 055)
other	87 (27 773)	10 (3 238)	3 (1 048)
gender composition			
male-dominated	91 (264 795)	8 (21 981)	2 (4 691)
gender-integrated	90 (115 633)	8 (9 963)	2 (2 294)
female-dominated	86 (276 295)	11 (35 719)	2 (7 613)

[1] Occupation which is used as a confounder with 355 categories is not shown here.
N – recruits.

Table 4. Likelihood (OR) that a workplace recruits men and women with different histories of sickness absence with regard to the average level of sickness absence in the workplace

Sickness absence in workplaces in 2006 (M)	Recruits absence due to illness (N = 747 256) [OR (95% CI)]			
	women		men	
	1–180 days absence in 2005 vs. 0 days	≥ 181 days absence in 2005 vs. 0 days	1–180 days absence in 2005 vs. 0 days	≥ 181 days absence in 2005 vs. 0 days
Crude				
≥ 13.4 days/year	1.9 (1.8–1.9)	7.5 (6.9–8.1)	1.9 (1.8–1.9)	7.2 (6.6–7.8)
9.6–13.3 days/year	1.5 (1.5–1.6)	3.5 (3.2–3.9)	1.4 (1.3–1.5)	3.0 (2.7–3.3)
5–9.5 days/year	1.3 (1.3–1.4)	2.4 (2.2–2.6)	1.2 (1.2–1.2)	2.0 (1.8–2.2)
0–4.9 days/year	1	1	1	1
Multivariate*				
≥ 13.4 days/year	1.6 (1.5–1.6)	7.8 (7.0–8.7)	1.6 (1.6–1.7)	6.7 (6.0–7.5)
9.6–13.3 days/year	1.4 (1.3–1.4)	4.2 (3.7–4.7)	1.4 (1.3–1.5)	3.6 (3.2–4.2)
5–9.5 days/year	1.3 (1.2–1.3)	2.8 (2.5–3.1)	1.3 (1.2–1.3)	2.5 (2.2–2.8)
0–4.9 days/year	1	1	1	1

* Controlled for recruits' age, education and occupation, proportions at the workplace with no more than secondary school, average age at workplace, number employed at workplace, gender composition at the workplace and sector.
M – mean; N – recruits; OR – odds ratio; CI – confidence interval.

In 2005/2006, sickness absence in Sweden was low and about 6% of the Swedish population was unemployed. To control for the results reflecting a business cycle, we analyzed sickness absence of recruits in 2002 in relation to the average sickness absence in the workplaces in 2003, when sickness absence levels in Sweden were high and unemployment figures had risen to about 8%. The results from 2002/2003 did not differ from those of 2005/2006.

It is possible that our results show how a new employee affects the average level of sickness absence instead of reflecting how the average level of sickness absence in the workplace affects the likelihood to employ an individual with high levels of sick leave. Therefore, we removed the sickness absence of recruits when computing the average level of sickness absence in the workplaces and performed an identical analysis as the one shown in Table 4. The results did not differ, which indicates that our results cannot be explained by the newly recruited individuals with previous high sickness absence that continue to have high sickness absence and thereby, contribute to the high average level of sickness absence in the workplace.

DISCUSSION

The results of this study provide evidence on a strong association between the average number of days of sickness absence in a workplace and the history of sickness absence among both male and female recruits. The likelihood of recruiting employees with a history of many days of sickness absence was higher in the workplaces where the average level of sickness absence was high. To the best of our knowledge, there are no previous studies with which the results can be compared.

The multivariate analysis did not alter the results of the crude analysis. The strong association between the average sickness absence in the workplace and a history of sickness absence among the recruits is, thus, not likely to reflect the

average age, number of employees, educational level, occupation, sector and gender composition in a workplace. The results indicate that a low level of sickness absence in a workplace is likely to be partly attributable to HWE and a healthy hire effect.

Virtanen et al. [12] have failed to explain differences in sickness absence between 4 factories of a food industry company by common risk factors such as health, socioeconomic characteristics and working conditions. Differences in moral and cultural communication of sickness absence in local work communities, called "sickness absence habitus," was proposed as an explanation. Our results support the view that one such a habitus in local work community may result in different hiring patterns causing different sickness absence by the healthy hire effect. Our results also indicate that the healthy hire effect is present in different business cycles. Why do workplaces differ in recruiting individuals with experience of high sickness absence? A focus group study proposed that employers who were open to hiring and accommodating people with disabilities had, for example, a more flexible and inclusive work culture, were better on job matching and had a better ability to supervise a diverse workforce than other employers [17]. If this is true, the experience of those employers may be used in informing and educating other employers in vocational rehabilitation.

An alternative explanation for why workplaces differ in recruiting people with a history of high sickness absence is that they have a different supply of possible recruits. If possible recruits to a workplace are individuals coming from workplaces with similar conditions and tasks, and job mobility is limited by previous experience and education, it could imply that there are groupings on the labour market of healthy individuals available to "healthy workplaces" and *vice versa*. The 3rd explanation is that the demand for healthy employees is high in the workplaces that do not recruit disabled people due to the type of work, for example a fire department that requires healthy individuals.

We found that, recruits were more likely to be recruited to a workplace with the high average sickness absence if they were females, recruited to the municipal sector or to a female-dominated workplace (Table 2). These findings are interesting as they probably reflect work conditions in healthcare, which is known to have high sickness absence, and employers need to recruit available staff. It might also reflect attitudes and readiness to recruit individuals with experience of long time sick leave. In an additional analysis we studied distribution of the workplace characteristics among workplaces using a different classification of sickness absence (0 days, 1–7 days, 8–28 days and ≥ 29 days). The patterns in these analyses were similar to those presented in Table 2.

A possible interpretation of the finding that individuals with high previous sick leave are likely to be recruited to workplaces with the high average sick leave is that they do not reflect a true association between individuals' sick leave and the level of sick leave in the workplaces, but that they reflect the fact that individuals with many days of sick leave are recruited/employed in jobs with poor work conditions, and that those jobs are located in workplaces with high sick leave levels. It could reflect a form of entrapment, with such individuals being locked in unfavorable work situations with little opportunity for improvement. A change of job is a change to a similar job with similar work conditions.

However, we controlled for the individuals' occupation previous year as a measure of work conditions, and this did not affect the results. It is well known that physically heavy work and demanding working positions are associated with occupation (see for example [24]). If individuals with heavy work and high sick leave levels tend to be recruited to yet another workplace with heavy work conditions and high levels of sick leave, and this would have caused the results, controlling for occupation should have affected the results.

We do not know whether or not the employers are aware of the previous sick leave or its causes at the time of the

recruitment. The importance put on health and fitness when recruiting is likely to vary across the labour market. Employers in the workplaces with low average education have been found to stipulate higher athletic demands when recruiting compared with employers in the workplaces with higher average education [25]. When recruiting to the male-dominated workplaces, employers are more likely to avoid hiring potentially "high-risk" workers, and also are more likely to dismiss workers with a record of sickness absence compared with employers in the female-dominated workplaces [26]. Regardless of whether the employers are aware of the previous sick leave or not, there is evidence showing that sickness absence increases the risk of losing employment, and even further increases the risk of not gaining new employment [27].

In summary, the healthy hire effect states that less healthy workers are less likely to acquire a new job [15]. The results of this study show a form of the healthy hire effect: a selection of healthy individuals to the workplaces with average good health, and a selection of individuals with poor health to the workplaces with poor health. The mechanism behind this phenomenon is unknown. It may be due to conscious acts on the part of an employer or an employee, or to other driving forces such as a labour market structure and the demand for and supply of possible recruits, i.e., a "necessary hire effect" may be at work.

Methodological considerations

Strengths of this study lie in the large sample size and longitudinal data, and the fact that the data on exposures and outcomes are based on legislation and paid benefits, which ensures their validity.

Whether employees recorded as being in a workplace, are actually employed in the workplace is crucial for this study. The recording of an individual's workplace is based on paid salaries reported by employers to the Swedish Tax Agency. If, for example, withheld vacation pay is paid out in November, after the employment has terminated, employment status may be given to someone who is not actually employed. However, such an overestimation is likely to be random between individuals and workplaces, and should, therefore, not affect our results. Illegal workers, who are not recorded by the Tax Agency, are not covered by our information on workplaces. We do not know the magnitude and distribution of illegal workers; however, we do not believe it is sufficiently widespread to affect our results.

Information on sickness absence is also central for this study. Our information is based on days of sickness absence for which compensation is paid by the SSIA, which compensates from day 15 of the sickness absence period. We, therefore, lack information concerning sickness absences lasting up to 14 days. From the 2nd day, this absence is mainly compensated by an employer. It may also be compensated in other ways such as through vacation or compensation leave. Because of this, some individuals' sickness absence will be misclassified. For example, an employee with 10 compensated days from an employer and no compensation from the SSIA will be classified to the group lacking sickness absence. This misclassification of sickness absence will of course also affect grouping of sickness absence in the workplaces.

We do not know whether the misclassification is non-differential or differential. Non-differential misclassification would mean that regardless of which group the individual or workplace belongs to, sickness absence for which no compensation is paid, is of similar size. With misclassification of this kind, the relationship between individuals and workplaces remains the same; it should, therefore, have a limited impact on our results.

Differential misclassification can be at least of 2 types. In one of these, the likelihood of sickness absence for which no compensation is paid by the SSIA increases with the increased compensated sickness absence; this is not likely to change the association found in this study. In the other type, the likelihood of having many days of sick leave for

which no compensation is paid by the SSIA decreases with higher compensated sickness absence. If this is true, our results may overestimate the true association. One circumstance that might affect whether non-compensated sickness absence would change the association found in our study is the magnitude of sickness absence spells of ≤ 14 days. Another circumstance is the importance of shorter spells of sickness absence for employers and employees at hiring. Further knowledge is required concerning both of these conditions.

Sick leave the year before the recruitment was chosen as a measurement of individuals' sick leave history. Sick leave records going back further in time could have been used to identify individuals with an even longer sick leave history, say, involving > 365 days. However, being on sick leave for long periods increases the risk of not returning to the labour market [28–30]. As we wanted to study recruitment of sick-listed individuals not too far removed from the labour market, the time limit, therefore, was set to 1 year.

In this group of long-term sick, there may be a smaller group of individuals with more time-limited sickness conditions, such as a broken bone, with otherwise good health. They are likely to somewhat dilute the association between sick leave among the recruits and the average sick leave in the workplace, as they are more similar to the group with no sick leave. However, the association we found is still strong. Some of the individuals might still have some form of sickness at the time of recruitment, while others do not. However, long-time sick leave is a predictor of future poor health, low mental wellbeing and low work ability [31,32], and also increases the probability of future sick leave [28,29]. Sick leave the year before the recruitment may, therefore, be an important indicator of the average level of sick leave in the new workplace.

We consequently believe that the association between recruits' history of sickness absence and the sickness absence level in the workplace will be connected to the recruits' health and work disability. It may of course be questioned whether sickness absence figures reflect poor health and/or disability. However, this connection is supported by previous studies that have found an association between sickness absence and future long-term self-rated health – those with higher levels of sickness absence are more likely to experience future sub-optimal health [33,34]. Previous sick leave is also associated with mortality and exit from the labour market, and is a strong predictor of relapse into new sick leave [28,29]. During the studied time period, musculoskeletal and mental disorders were common causes of sick leaves in Sweden, conditions that are associated with a relapse and disability pension [35].

We lack information about employment status. As those on temporary employment have lower sickness absence than those permanently employed [36] and the number of those temporarily employed is likely to vary between different workplaces, employment status might be a potential confounder. This is a condition to consider in the future studies.

Implications

The results in this study may have at least 3 implications. The 1st is that caution is called for in interpreting the average sickness absence in a workplace solely as a reflection of working conditions and leadership. Based on such interpretations, management strategies in organizations with low levels of sickness absence have been studied. One of the purposes of those studies is to encourage that strategies used in the workplaces with low levels of sickness absence are adopted by the workplaces with higher absence levels [37–39]. Sickness behavior, such as low absence, is also used as an indicator of a "healthy organization" [40].

The 2nd is that knowledge on the average level of sickness absence in workplaces may be considered by stakeholders in vocational rehabilitation when supporting return to work. However, before recommendations can be made, we need more knowledge on why workplaces recruit differently.

The 3rd possible implication is that increased knowledge on different recruitment patterns between workplaces can be an underlying source of information for policies and support for employers when hiring individuals who have experienced sickness absence.

CONCLUSIONS

The results show that there is a greater likelihood of employing individuals with high levels of sickness absence in the workplaces with many days of the average sickness absence compared with the workplaces with few days of the average sickness absence. The study, thus, supports the hypothesis that, in addition to working conditions and leadership style, the average sickness absence in a workplace may also reflect a healthy hire effect.

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