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Published in:
OCCUPATIONAL AND ENVIRONMENTAL MEDICINE

DOI:
[10.1136/oem.2007.034322](https://doi.org/10.1136/oem.2007.034322)

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Document Version
Publisher's PDF, also known as Version of record

Publication date:
2008

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Citation for published version (APA):

Koopmans, P. C., Roelen, C. A. M., & Groothoff, J. W. (2008). Frequent and long-term absence as a risk factor for work disability and job termination among employees in the private sector. OCCUPATIONAL AND ENVIRONMENTAL MEDICINE, 65(7), 494-499. DOI: 10.1136/oem.2007.034322

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Occup. Environ. Med. 2008;65:494-499; originally published online 21 Nov 2007;
doi:10.1136/oem.2007.034322

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Frequent and long-term absence as a risk factor for work disability and job termination among employees in the private sector

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Accepted 9 November 2007
Published Online First
21 November 2007

ABSTRACT

Objectives: Frequent and long-term absentees were monitored over 5 years with regard to the risk of work disability and job termination.

Methods: A prospective longitudinal cohort study in 53 990 employees of Dutch postal and telecommunications companies. In the first year of the study, employees who were absent four times or more (frequent absentees; $n = 4126$), for 6 weeks or more (long-term absentees; $n = 3585$), and combined frequent and long-term absentees ($n = 979$) were distinguished, together with a reference population consisting of 45 300 employees. The disability rate (defined as the number of employees who were absent for >1 year per 100 employee-years) and the risk of job termination were determined over a period of 4 years.

Results: In the reference population, women had a higher disability rate (2.2 per 100 employee-years) than men (0.8 per 100 employee-years). Frequent absentees had a disability rate amounting to 2.5 per 100 employee-years in men and 4.2 per 100 employee-years in women. Long-term absentees had a disability rate of 6.7 per 100 employee-years in men and 9.1 per 100 employee-years in women. Combined frequent and long-term absentees had an even higher disability rate. The risk of employment being terminated (involuntarily) was higher in prior absentees as compared with the reference population ($RR = 1.2$ – 2.1 for job termination and $RR = 1.5$ – 2.5 for involuntary job termination). In men, absences due to neoplasms, mental disorders and respiratory disorders were associated with an increased disability risk as compared with musculoskeletal disorders. Neoplasms and mental disorders were also associated with a higher risk of job termination in men, whereas infectious and neurological diseases were associated with a higher risk of job termination in women.

Conclusions: Prior frequent and/or long-term absentees show high work disability in a 4-year follow-up period. Moreover, they are at higher risk of (involuntary) job termination.

Absence due to sickness is considered an indicator for poor employee well-being and ill health.¹ In most European countries, inequalities in health or chronic disease interfere with entering and maintaining paid employment.² Employees with increased sickness absence rates are at risk of disability pension and job termination.^{3,4} Virtanen *et al* found higher rates of sickness absence to increase the risk of job termination and unemployment among women in temporary public sector jobs.⁵ In men and in permanent employees no such association was found. Among older employees,

high absence rates were associated with subsequent disability pension. Their study was performed in the public sector in Finland. They recommended that an examination should be carried out into whether these findings could be extended to the private sector. Their study focused on absence duration. However, frequent absentees were shown to be at risk of absence in later years.⁵

In this study, the risk of work disability and job termination in frequent and long-term absentees among employees in the private sector were prospectively monitored over a period of 4 years. The research questions are:

1. Are frequent and/or long-term absentees more likely to become entitled to disability benefit compared with the reference group?
2. Are frequent and/or long-term absentees more likely to terminate their job compared with the reference group, and what are the reasons for job termination?
3. Which long-term absence diagnoses result in a higher risk of disability and job termination?

SUBJECTS AND METHODS

Study population and type of study

A longitudinal study was performed in a cohort of 53 990 employees working in three national Dutch postal and telecommunications companies. Activities included sorting and delivery of mail, transportation of mail, call centre and post office work, telecommunication maintenance and executive functions.

The absenteeism dates in the years 1997–2001 were collected retrospectively. Data collection was restricted to this period, because in 2002 Dutch absence legislation changed, resulting in a marked decline in absence due to sickness in The Netherlands.⁶

Based on the absenteeism dates in 1997, three groups were distinguished:

1. Frequently absent employees ($n = 4126$), defined as those who took ≥ 4 sick leaves in 1997, with a duration of < 6 weeks.
2. Long-term absent employees ($n = 3585$) who were absent for ≥ 6 weeks in 1997.
3. Combined frequent and long-term absent employees ($n = 979$); these employees were not counted in either the frequent or the long-term absent group.

The remaining 45 300 employees were neither frequent nor long-term absentees; they were regarded as the reference group.

Employees ≥ 55 years in 1997 were excluded because of a possible distortion due to early

retirement schemes or other seniority regulations. Employees who became entitled to disability benefit (after 1 year of absence) in 1997 were excluded. Absence due to maternity leave was also excluded.

The mean age of 40 of our study population was higher than the mean age of the general Dutch working population aged <55, which was 36 in 1997.⁶

Measurements

Absenteeism data

Our occupational health department collected sickness absence data by automatic upload from the company absence registers. Absent employees visited the occupational health physician for a medical certification of absence, usually in the third week of absence.

Employee and function characteristics

Gender, age (<35, 35–44, 45–54 years), marital status (married/not married) and seniority (0–4 years, 5–9 years, 10–14 years, 15–19 years, ≥20 years) of employees working full-time or part-time were studied. Their salary scales (1–2, 3, 4–5, 6–7, ≥8) were comparable with the government salary scales, with maximum gross monthly salaries in 2000 ranging from €1570 (scale 2), 1722 (scale 3), 1927 (scale 5), 2275 (scale 7) to €2540 (scale 8). They worked in urban regions encompassing at least 1500 addresses per km² or rural areas where there were fewer than 1500 addresses per km².

Outcome measures

In the four follow-up years, disability pension and job termination were distinguished as outcome variables. In The Netherlands, an employee can receive disability benefit after 1 year of incapacity for work. We used 1 year of absence as a proxy for disability benefit.

The reason for job termination was based on employer records. We divided the reasons into voluntary (eg, acceptance of another job) and involuntary (eg, discharged, expiration of contract).

Diagnosis

Medical certification of long-term absence episodes in 1997 was established according to the International Classification of Diseases, ninth revision (ICD-9). In 3963 cases (87%), an ICD-9 diagnosis could be recovered, of which 701 (17.7%) employees had two (n = 617), three (n = 75) or four (n = 9) long-term absence episodes. When the employee had more than one long-term absence in 1997, the diagnosis for the longest absence period was selected.

The following categories (corresponding codes) were distinguished: infectious diseases (001–139), neoplasms (140–239), mental disorders (290–319), diseases of the nervous system and senses (320–389), cardiovascular diseases (390–459), respiratory diseases (460–519), digestive disorders (520–579), pregnancy-related disorders (630–679), disorders of the musculoskeletal system and connective tissue (710–739), injuries (800–999) and other (all other codes).

Mental disorders were further categorised into anxiety, dissociative and somatoform disorders (300), adjustment reaction (309), depressive disorder (296.2, 296.3, 311) and other. Disorders of the musculoskeletal system were distinguished into arthropathies (joint pain, 710–719), dorsopathies (back pain, 720–724) and rheumatism (specific inflammatory disease of joints, muscles and tendons, 725–729).

Statistical analyses

The disability rate was computed by dividing the number of employees who became absent for more than 1 year by the total number of years all employees stayed employed. The quotient was multiplied by 100. The disability rates were predicted from the covariates by means of Cox regression analysis with hazard ratios (HRs) as outcome. The HR is the effect of an explanatory variable on the hazard or risk of an event. A HR <1 indicates a prolonged duration until disability; a HR >1 indicates a shorter duration.

The risk of job termination was investigated using a logistic regression analysis with odds ratios (ORs) as outcome. In the case of frequently occurring events (>10%), such as job termination, the OR does not provide a proper estimate of the relative risk (RR).⁷ Therefore, ORs of job termination were converted into RRs using the following formula⁸:

$$RR = \frac{OR}{(1 - P_0) + (P_0 * OR)}$$

OR is the estimated odds ratio and P_0 the proportion of employees with the outcome (eg, job termination) in the reference group. An ENTER procedure was used to identify the relative contribution of the predictors. Significance was based on the Wald statistic ($\alpha = 5\%$).

For employees leaving employment, a logistic regression analysis was performed, with voluntary/involuntary job termination as dependent variable.

RESULTS

Sickness absence data of 38 049 men (mean age 41 years, SD 8 years) and 15 941 women (mean age 39 years, SD 8 years) were collected. Table 1 presents the distribution of the study variables by gender. Men more often worked in transportation functions and in mail delivery, technical and management functions, and women more often worked in call centre, administrative and sales functions.

Work disability

In the period 1998–2001, 3616 employees (6.7%) were absent for more than 1 year. In table 2 the disability rates are presented. Women had higher disability rates than men. The disability rate was higher when there were frequent and/or long-term absences in the first year of the study.

Long-term and combined frequent and long-term absentees had the highest disability risk: HR 6.6 (95% CI 5.9 to 7.4) and 8.3 (95% CI to 7.0–9.9) in men and HR 4.2 (95% CI 3.7 to 4.7) and 5.2 (95% CI 4.3 to 6.2) in women. Frequent absentees also had an increased disability risk: HR 2.8 (95% CI 2.4 to 3.2) in men and 2.0 (95% CI 1.7 to 2.3) in women. Elderly employees, unmarried employees, employees working in urban areas, employees on lower salary scales and employees with a seniority of over 5 years had higher disability risks.

Job termination

In the period 1998–2001, 10 959 employees (20%) left employment (table 2). Frequent and/or long-term absentees had higher risks of leaving employment. In both sexes, frequent absentees had a 1.3 (95% CI 1.2 to 1.4) times higher risk of terminating employment and long-term absentees a 1.4 (95% CI 1.3 to 1.6) times higher risk relative to the reference population. Combined frequent and long-term absent male and female absentees had a 1.8 times (95% CI 1.6 to 2.1) and 1.6 times (95% CI 1.4 to 1.8)

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Table 1 Characteristics of the study population

	Men, n (%)	Women, n (%)
Age		
<35 years	8727 (23)	5546 (35)
35–44 years	15 490 (41)	5840 (37)
45–54 years	13 832 (36)	4555 (29)
Unmarried	12078 (32)	5937 (37)
Married	25971 (68)	10 004 (63)
Salary scale 1–2	1227 (3)	1589 (10)
Salary scale 3	10 332 (27)	2771 (17)
Salary scale 4–5	6732 (18)	5771 (36)
Salary scale 6–7	10 811 (28)	4245 (27)
Salary scale 8+	8925 (24)	1562 (10)
Rural workplace	10 156 (27)	3051 (19)
Urban workplace	27 893 (73)	12 890 (81)
Full-time	34 593 (91)	4740 (30)
Part-time	3456 (9)	11 201 (70)
Seniority		
<5 years	3710 (10)	2721 (17)
5–9 years	6513 (17)	5384 (34)
10–14 years	5282 (14)	3549 (22)
15–19 years	8292 (22)	2555 (16)
≥20 years	14 252 (38)	1732 (11)
Frequent absence	2476 (7)	1650 (10)
Long-term absence	2161 (6)	1424 (9)
Frequent and long-term absence	542 (1)	437 (3)
Reference population	32 870 (86)	12 430 (78)
Total	38 049 (100)	15 941 (100)

higher risk, respectively. Younger employees terminated employment more often than older employees. Interaction effects with prior absence were not significant.

Table 3 shows the HRs and RRs of disability and job termination by prior absence in different gender and age groups as compared with the within-group reference population. Combined frequent and long-term absence was associated with a high disability risk (HR 4.7–20.2). Prior long-term absence was related to a higher risk of disability (HR 3.7–11.8). In prior frequent absentees, the HR varied between 1.8 and 3.0. Women aged 45–54 years had the highest disability rates.

Job termination decreased with age, and was highest in employees younger than 35 years of age: about one-third terminated their employment within 4 years. Prior frequent and/or long-term absence was associated with a higher risk of job termination (RR 1.2–2.1).

Reasons for terminating employment

The reason for job termination was known in 81% of the cases. A larger proportion of employees with a history of absence left

their employment involuntarily as compared with the reference population; see table 4 ($\chi^2 = 343$, $df = 3$, $p = 0.000$).

Women more often left employment involuntarily than men; after adjustment for the other variables RR 1.1 (95% CI 1.0 to 1.3). The probability of involuntary job termination increased with age, with RR 1.4 (95% CI 1.3 to 1.6) among those aged 35–44 and RR 3.0 (95% CI 2.7 to 3.4) among those aged 45–54. When previously absent, the probability of leaving employment involuntarily increased, with RR 1.5 (95% CI 1.3 to 1.8) in frequent absentees, RR 2.3 (95% CI 2.0 to 2.5) in long-term absentees and RR 2.5 (95% CI 2.1 to 2.9) in combined frequent and long-term absentees. No interaction effects with prior absence were found.

Diagnosis

Disability and job termination by prior long-term absence diagnosis are presented in table 5.

As in the study of Gjesdal and Bratberg,⁹ musculoskeletal disorders were considered the reference group (table 5). In the subgroups of mental and musculoskeletal disorders, adjustment reactions and arthropathies were considered the reference categories, respectively. In men, absence due to neoplasms (HR 4.9), mental disorders (HR 1.4) or respiratory disorders (HR 1.9) in 1997 was associated with an increased disability risk in the following years as compared with musculoskeletal disorders. Being long-term absent due to injuries was associated with a lower disability rate in both sexes (HR 0.7 in men and 0.6 in women). In women, the other diagnostic categories did not significantly differ in disability risk.

In both sexes, the disability rate was higher for depressive disorders as compared with adjustment reactions. In men, anxiety disorders and other psychiatric disorders (including psychoses) were associated with a higher disability risk. The HR for disability was not significantly different for the various types of musculoskeletal disorders.

In men, neoplasms (RR 3.0) and mental disorders (RR 1.3) were associated with a higher risk of job termination as compared with musculoskeletal disorders. In women, infectious diseases (RR 1.7) and diseases of the nervous system (RR 1.6) were associated with a higher risk of job termination as compared with musculoskeletal disorders. The risk of job termination was not significantly different for the various types of mental or musculoskeletal disorders.

DISCUSSION

Employees who were absent frequently and/or for longer periods were at increased risk of work disability in later years. They were also at increased risk of leaving their employment involuntarily. We used 1 year of sickness absence as a proxy for

Table 2 Disability and job termination related to prior absence by gender

Prior absence	Number of employees		Work disability						Termination of employment	
			Men			Women			Men	Women
	Men	Women	n	Years at risk	Disability rate per 100 employee-years	n	Years at risk	Disability rate per 100 employee-years	n (%)	n (%)
Frequent absence	2476	1650	213	8603	2.5	227	5399	4.2	547 (22.1)	509 (30.8)
Long-term absence	2161	1424	517	7684	6.7	433	4735	9.1	430 (19.9)	437 (30.7)
Frequent and long-term absence	542	437	152	1876	8.1	145	1392	10.4	135 (24.9)	161 (36.8)
Reference population	32 870	12 430	998	117 526	0.8	931	42 729	2.2	5799 (17.6)	2941 (23.7)
Total	38 049	15 941	1880	135 688	1.4	1736	54 255	3.2	6911 (18.2)	4048 (25.4)

Table 3 Prior absence as a predictor of disability and job termination expressed as HRs and RRs (95% CIs)

	Work disability				Job termination			
	Men		Women		Men		Women	
	Rate	HR* (95% CI)	Rate	HR* (95% CI)	%	RR* (95% CI)	%	RR* (95% CI)
<35 years	0.7		2.4		31		33	
Reference population	0.4	1.0	1.5	1.0	31	1.0	32	1.0
Frequent absence	1.2	3.0 (1.9 to 4.6)	3.4	2.2 (1.7 to 2.9)	36	1.3 (1.2 to 1.4)	37	1.2 (1.1 to 1.3)
Long-term absence	5.4	11.8 (8.3 to 16.9)	7.3	4.8 (3.8 to 6.2)	31	1.2 (1.0 to 1.4)	35	1.3 (1.1 to 1.4)
Frequent and long-term absence	8.6	20.2 (12.1 to 33.5)	7.8	5.0 (3.5 to 6.9)	34	1.3 (0.9 to 1.7)	40	1.4 (1.1 to 1.6)
35–44 years	1.3		3.0		15		24	
Reference population	0.8	1.0	2.0	1.0	15	1.0	22	1.0
Frequent absence	2.2	2.6 (2.0 to 3.3)	3.7	1.8 (1.4 to 2.4)	19	1.4 (1.2 to 1.5)	30	1.4 (1.2 to 1.6)
Long-term absence	6.3	7.0 (5.9 to 8.4)	8.7	4.3 (3.6 to 5.3)	19	1.5 (1.3 to 1.7)	32	1.5 (1.3 to 1.7)
Frequent and long-term absence	7.8	8.7 (6.7 to 11.3)	11.3	5.8 (4.3 to 7.7)	23	1.9 (1.5 to 2.3)	36	1.7 (1.3 to 2.1)
45–54 years	1.8		4.4		13		18	
Reference population	1.2	1.0	3.1	1.0	13	1.0	16	1.0
Frequent absence	3.7	3.0 (2.4 to 3.7)	6.3	2.0 (1.6 to 2.6)	15	1.3 (1.1 to 1.5)	22	1.4 (1.1 to 1.7)
Long-term absence	7.4	5.8 (5.0 to 6.7)	11.0	3.7 (3.1 to 4.4)	18	1.5 (1.3 to 1.7)	26	1.7 (1.4 to 2.0)
Frequent and long-term absence	8.3	6.8 (5.3 to 8.8)	12.8	4.7 (3.5 to 6.3)	24	2.1 (1.6 to 2.6)	33	2.1 (1.6 to 2.7)

*As compared with the within-group reference population. Adjusted for civil status, working full-time/part-time, salary scale, seniority and urbanisation level.

work disability. In The Netherlands, an employee can receive disability benefit after 1 year of (partial) incapacity to work. If an employee has been granted sickness benefit for more than 1 year and does not have the same earning capacity as before, he/she may be entitled to occupational disability benefit. A governmental institution of social security decides whether the employee is entitled to disability benefit. It would be interesting to know how many employees return to work after receiving temporary disability pension and how many end up on permanent disability pension. However, privacy regulations and technical problems make it impossible to study the social security files.

The mean age of the study population was higher as compared with the Dutch workforce, which may have contributed to the relatively high percentage (6.7%) of employees who were absent for 1 year or more. The high disability figure is, however, in line with national statistics.⁶ Moreover, in the companies studied, several reorganisations and downsizing operations took place, and at that time it was quite common in The Netherlands to grant ill employees a disability benefit rather than an unemployment benefit.

Work disability

In our study, long-term absence was the most important predictor of work disability. This is in agreement with the results of other studies showing that the duration of sick spells is an important predictor of disability.^{4 10–14} Gjesdal *et al* found 22.9% of long-term absentees to be on disability pension within 5 years, which is comparable with our study in which about a quarter became entitled to disability benefit.¹¹ The disability rate in frequent absentees was about twice as high as in the reference population. Combined frequent and long-term absent employees had the highest disability rates: 8.1 per 100 employee-years in men and 10.4 per 100 employee-years in women respectively.

The relationship between frequent absence and the risk of future disability has not been documented before. Kivimäki *et al*¹⁴ found that having two or more short spells of absence per year was not related to later disability pension when long absence spells were adjusted for. We defined frequent absence as being absent four times or more and we distinguished long, frequent and combined absence into separate groups, which might explain the difference.

Table 4 Reasons for job termination related to prior absence

	Frequent absence	Long-term absence	Frequent and long-term absence	Reference population	Total
	n (%)	n (%)	n (%)	n (%)	n (%)
Voluntary job termination:	678 (76)	437 (61)	153 (60)	5967 (85)	7235 (81)
Acceptance of another job	371 (42)	192 (27)	66 (26)	3416 (48)	4045 (45)
Other personal reasons	269 (30)	187 (26)	73 (28)	1904 (27)	2433 (27)
Early retirement/pension	36 (4)	51 (7)	12 (5)	570 (8)	669 (8)
Other	2 (0)	7 (1)	2 (1)	77 (1)	88 (1)
Involuntary job termination:	212 (24)	282 (39)	104 (40)	1084 (15)	1682 (19)
Inadequate functioning/disturbed working relationship	51 (6)	23 (3)	14 (5)	154 (2)	242 (3)
Reorganisation as part of the social plan	48 (5)	52 (7)	18 (7)	361 (5)	479 (5)
No extension of the employment contract	61 (7)	26 (4)	16 (6)	287 (4)	390 (4)
Total disability	40 (4)	144 (20)	46 (18)	125 (2)	355 (4)
Death	12 (1)	37 (5)	10 (4)	157 (2)	216 (2)

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Table 5 Diagnosis of long-term absence in the reference year as a predictor of disability and job termination

	Total*		Work disability				Job termination			
	Men	Women	Men		Women		Men		Women	
	n	n	Rate	HR† (95% CI)	Rate	HR† (95% CI)	%	RR† (95% CI)	%	RR† (95% CI)
Infectious diseases	50	27	8.3	1.6 (0.9 to 2.7)	10.1	1.2 (0.6 to 2.6)	24%	1.2 (0.7 to 1.9)	56%	1.7 (1.0 to 2.3)‡
Neoplasms	26	69	21.2	4.9 (2.8 to 8.5)‡	12.5	1.1 (0.8 to 1.7)	58%	3.0 (2.0 to 4.0)‡	30%	1.0 (0.7 to 1.4)
Mental disorders	547	388	8.2	1.4 (1.2 to 1.8)‡	11.0	1.1 (0.8 to 1.3)	25%	1.3 (1.0 to 1.6)‡	32%	1.0 (0.8 to 1.2)
Adjustment reactions§	417	296	6.7	1.0	10.1	1.0	23%	1.0	34%	1.0
Anxiety, dissociative, somatoform disorders	33	19	12.4	1.8 (1.0 to 3.3)‡	14.0	1.4 (0.7 to 2.9)	36%	1.6 (0.9 to 2.4)	21%	0.6 (0.2 to 1.4)
Depressive disorders	46	33	12.9	2.2 (1.3 to 3.5)‡	15.9	1.8 (1.0 to 3.0)‡	30%	1.3 (0.8 to 2.0)	36%	1.2 (0.7 to 1.7)
Other mental disorders	51	40	13.2	1.8 (1.1 to 2.9)‡	11.3	1.1 (0.6 to 1.9)	27%	1.3 (0.8 to 2.0)	23%	0.7 (0.4 to 1.2)
Diseases of the nervous system/senses	72	36	8.6	1.4 (0.9 to 2.2)	12.9	1.4 (0.8 to 2.4)	19%	1.1 (0.6 to 1.7)	50%	1.6 (1.1 to 2.2)‡
Cardiovascular diseases	163	42	8.1	1.3 (0.9 to 1.7)	12.7	1.2 (0.7 to 1.9)	18%	1.0 (0.7 to 1.4)	26%	0.9 (0.5 to 1.5)
Respiratory diseases	67	38	11.6	1.9 (1.3 to 2.9)‡	11.6	1.1 (0.6 to 1.8)	28%	1.5 (1.0 to 2.2)	18%	0.5 (0.3 to 1.1)
Digestive disorders	115	33	4.8	0.8 (0.5 to 1.2)	8.2	0.8 (0.4 to 1.5)	18%	1.0 (0.6 to 1.4)	27%	0.9 (0.5 to 1.6)
Pregnancy-related disorders		109			8.1	0.9 (0.6 to 1.4)			34%	0.9 (0.6 to 1.3)
Musculoskeletal disorders§	837	433	6.5	1.0	10.6	1.0	19%	1.0	30%	1.0
Arthropathies§	141	53	5.9	1.0	10.3	1.0	21%	1.0	30%	1.0
Dorsopathies	369	183	6.3	1.0 (0.7 to 1.6)	11.1	1.1 (0.6 to 1.8)	19%	0.9 (0.6 to 1.3)	27%	1.0 (0.6 to 1.5)
Rheumatism	326	195	7.0	1.0 (0.7 to 1.6)	10.0	1.0 (0.6 to 1.6)	18%	0.9 (0.6 to 1.4)	31%	1.1 (0.7 to 1.6)
Injuries	335	126	4.4	0.7 (0.5 to 0.9)‡	6.4	0.6 (0.4 to 0.9)‡	15%	0.7 (0.5 to 1.0)	28%	0.8 (0.6 to 1.2)
Other	123	156	7.4	1.1 (0.8 to 1.6)	8.0	0.8 (0.6 to 1.1)	21%	1.1 (0.7 to 1.5)	35%	1.2 (0.9 to 1.5)
Total	2335	1457	7.0		10.0		21%		32%	

* Total of the employees whose long-term absence diagnosis in the reference year is known.

†Adjusted for age, marital status, working full-time/part-time, salary scale, seniority and urbanisation level.

‡Significant ($\alpha = 5\%$).

§Reference category.

In sickness absence research, short-term and long-term sickness absences are usually distinguished. Short-term sickness absence is often regarded as a coping mechanism to prevent long-term absence rather than an expression of poor health.¹⁵ Our results did not support this theory, as frequently absent employees had an increased risk of disability relative to the reference population. However, our findings may also be caused by differences in health status. The majority of the participants in the reference group were presumably healthy, with no need of absence in the first place.¹⁶ Employees who are absent frequently possibly have a chronic disease, and the chronically ill are absent more often.¹⁷ An alternative explanation is that employees who report sick frequently are preoccupied with their bodily sensations and react excessively or inappropriately to their symptoms regardless of their objective state of health in terms of disease. When they do develop a disease, their absence will presumably have a longer duration.

In accordance with previous studies, women, elderly people, unmarried people, employees in urban work places, employees on lower salary scales and employees with greater seniority had an increased disability risk.^{13 18}

As was found by other authors, pregnancy-related disorders were not related to future disability, and being absent due to injuries was associated with a lower disability risk in both sexes.⁹⁻¹¹

In men, the disability risk of absence due to neoplasms, mental disorders and respiratory disorders was significantly higher compared with musculoskeletal disorders. The results are partly comparable with those of Gjesdal and Bratberg, who found mental disorders, diseases of the circulatory systems and respiratory disorders to increase the disability risk in men, and disorders of the nervous system/senses in women as compared with musculoskeletal disorders.⁹ In contrast to our results, they found no significant increase in disability in the case of neoplasms. Gjesdal *et al* found men on sick leave for mental

health disorders to have an increased disability risk as compared with musculoskeletal disorders.¹¹ They found no differential increase in disability risk by diagnosis in women, which is in accordance with our results.

In men, the hazard rate of work disability due to neoplasms (4.9) was much higher than in women (1.1). In women, leiomyoma of the uterus and breast cancer were the most prevalent types. Leiomyomas are benign neoplasms and are easily treatable by hysterectomy. Breast cancer is likely to be detected in the population screening programme at an early stage, which has good prognosis for return to work, explaining the lower disability risk in women.

Mental disorders were a large category, with high disability rates of 8.2 per 100 employee-years in men and 11.0 per 100 employee-years in women. The importance of mental disorders in the prediction of disability corresponded to other studies.^{9 11 19 20} Depression had the highest disability risk. In order to reduce future disability, special consideration should be given to depressed employees.

Enthoven *et al* found at least moderate disability at 5-year follow-up in 36% of patients with low back pain treated in primary care.²¹ In our sample, the corresponding disability figure at 4-year follow-up was 28% (23% in men and 38% in women). According to Gjesdal *et al*, osteoarthritis and rheumatoid disorders had significantly increased disability rates compared with back problems.¹¹ We found no differences in disability risk between arthropathies, rheumatism and dorsopathies. However, the numbers upon which these conclusions are based were small. It is recommended that these findings be replicated in larger scale studies.

Job termination

Frequent and/or long-term absentees had an increased risk of leaving their employment. This corresponds to other studies.^{3 22}

Main messages

- ▶ Among employees in the private sector, frequent and/or long-term absence was associated with an increased risk of future disability and (involuntary) job termination.
- ▶ In men, prior long-term absence due to neoplasms, mental disorders or respiratory disorders was associated with an increased disability risk as compared with musculoskeletal disorders. In women, no such difference was found.
- ▶ In men, prior long-term absence due to neoplasms and mental disorders gave a higher risk of job termination and in women long-term absence due to infectious diseases and diseases of the nervous system and senses carried a higher risk.

Policy implications

- ▶ It is important to monitor employees who are absent for longer periods of time and employees who are absent frequently in an attempt to reduce disability rates.
- ▶ Older employees are more at risk of long-term absence, disability and involuntary job termination. Considering that the working population is growing older, it is important to stimulate age-related management policies to prevent employees from dropping out.
- ▶ Special attention should be paid to employees who are absent in the long term due to depressive disorders, as they are at risk of disability.

We found RRs ranging from 1.2 to 2.1 for employees with prior absence. Among those leaving employment, the RR of involuntary job termination by prior absence ranged between 1.5 and 2.5. Virtanen *et al* found job termination among employees with high sickness absence to be 1.6 times higher than for those with low sickness absence.³ Possibly frequent or long-term absence is the result of a mismatch between the person and job. Alternatively, employers might tend to dismiss frequently or long-term absent employees.

Younger employees in the private sector more often left employment than older employees. It is known that recent graduates start working in jobs which do not match their degree. While working, they apply for better jobs. Alternative explanations for the fact that young employees more often resigned might be less commitment to the organisation, low job satisfaction and an adverse combination of work and private life. Older employees were more at risk of involuntary job termination than younger employees. In contrast to Virtanen *et al*, we found no age difference in the relationship between sickness absence and the risk of job termination.³

In men, respiratory disorders were more strongly associated with disability and job termination than in women. This may be explained by the fact that men more often than women work in physically strenuous jobs, and respiratory disorders might interfere with returning to manual work.

Moreover, in men, neoplasms and mental disorders were associated with a higher risk of job termination. Women suffering from infectious diseases and diseases of the nervous system were at higher risk for job termination. Further research should discover the reasons for these links.

Methodological considerations

Because postal and telecommunications companies were studied, the results are not representative for the entire Dutch private business community. However, the study is based on a considerable sample size of employees with various types of activities (heavy physical labour, back-office, technical, sales, IT and executive functions) employed all over the country. Moreover, the sickness absence data and the diagnoses were derived from registers rather than self-rated.

The study design did not include a wash-out period between exposure and outcome. The associations found could partly be explained by absences which started in 1997 and continued for 365 days or more in the following years, or by absence which continued from 1997 into subsequent years with only a minor break.

Competing interests: None.

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