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Risk of future sickness absence in frequent and long-term absentees

Petra C. Koopmans^{1,2}, Corné A. M. Roelen^{1,3} and Johan W. Groothoff¹

Background	Prior absence is an important predictor for sickness absence, but little is known about the recurrence among frequent and/or long-term absentees, over a longer period of time.
Aim	To monitor sickness absence among frequent and long-term absentees in order to investigate their risk of recurrent absence.
Methods	Longitudinal cohort study in employees working in three large Dutch postal and telecommunications companies. In the first year of study, we distinguished employees who were absent four times or more (frequent absence), employees who were absent for ≥ 6 weeks (long-term absence), combined frequent and long-term absence and a reference population. The absence rates in these groups were followed-up for 4 years.
Results	The study population ($n = 53\,990$) comprised 4126 frequent absentees, 3585 long-term absentees, 979 combined frequent and long-term absentees and a reference population ($n = 45\,300$). Frequent absentees had a higher risk of recurrent frequent absence when compared to the reference population, with rate ratios (RR) amounting to 4.9 [95% confidence interval (CI) 4.7–5.1] in men and 3.2 (95% CI 3.0–3.4) in women. They also had a higher risk of developing long-term absence: RR = 1.9 (95% CI 1.8–2.0) in men and 1.5 (95% CI 1.4–1.6) in women. Long-term absentees had high risk of recurrence: RR = 1.9 (95% CI 1.8–2.0) in men and RR = 1.4 (95% CI 1.3–1.5) in women.
Conclusions	Employees with prior frequent and/or long-term absence were at risk of recurrent absence. Frequent absence was a prognostic factor predicting future long-term absence.
Key words	Absence; age; epidemiological studies; frequent absence; gender; long-term absence; recurrence; risk factors.

Introduction

Absence is an important economic problem resulting in high costs for companies and society. Sickness absence is associated with reduced employee well-being and ill-health [1]. In almost all European Union (EU) countries, initiatives are being undertaken to promote health at work and to reduce sickness absence [2]. According to Gimeno *et al.* [3], the Netherlands has one of the highest absence percentages of EU countries. This makes sickness absence and its determinants an important topic of study to Dutch occupational health researchers.

Absence has been reported to be related to employee characteristics (such as personality, gender, age, education, marital status, ethnicity, nutrition and lifestyle), function (seniority, permanent or temporary, full-time or part-time, salary level), company characteristics and working conditions [4–14]. Longitudinal research shows that employees with a history of prolonged or recurrent sickness absence are at risk of future absence [5,7,11,14]. Employees with a history of musculoskeletal sick leave in the past 12 months had an almost 3-fold risk on recurrent sickness absence than those without [15]. Smulders and Nijhuis [11] found age, health and prior absence to be the best predictors for future sickness absence. Consistent evidence showed that older age and a history of sickness absence were related to long-term sick leave [14]. The number of periods absent was more stable in time than the number of days absent [11]. Frequent absence had a high risk of repetition [16]. Frequent absence may be related to the need to relieve heavy job demands or burden imposed by the private situation, thereby preventing long-term absence [16,17].

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On the other hand, frequent absence may be an indicator of more severe underlying health problems and a predictor of long-term absence [16]. Health and chronic illness are known to explain recurrent long-term absence. Eriksen *et al.* [18] reported that health complaints were associated with a higher risk of sickness absence. Andrea *et al.* [19] reported the presence of at least one long-term disease to be one of the strongest predictors for long-term sickness absence. However, Ihlebaek *et al.* [20] suggested that sickness absence is associated with changes in working life and health expectations rather than with the prevalence of health complaints.

Little is known about development of absence over a longer period of time and the recurrence risks of frequent and long-term absence. This study researched the risk of recurrent sickness absence in employees with either frequent or long-term absence or both in the first year of a five-year follow-up period.

Methods

The study population consisted of employees working in three national Dutch postal and telecommunications companies in the private sector. The occupational health department registered sickness absence in these companies by automatic upload from the company absence registers. All occupational health department staff have signed a statement of confidentiality. Employees who were employed all the year 1997 were selected for the inclusion in the study. Employees aged 55 years or older in the reference year were excluded because of possible bias due to senior regulations or early retirement. Employees who became 55 years or older in the follow-up period, however, were included. Employees who reached disability pension (defined as 1 year of absence) in the first year of study were also excluded.

Using the absence data in 1997, we identified four separate groups. The first group consisted of employees who had four or more periods of absence, with a duration <6 weeks (frequent absentees). The second group included employees who had an absence period of ≥6 weeks (long-term absentees). Employees with combined frequent and long-term absence in 1997 constituted the third group and were not counted in either the frequent or the long-term absent group. The remaining employees were regarded as the reference group.

Sickness absence was calculated from the number of calendar days absent from work due to disease. The length of the period of absence was defined as the number of calendar days from the first day the employee is absent until the day of complete work resumption. In line with Dutch sickness absenteeism statistics, the number of (frequent and long-term) absence spells is based upon uninterrupted episodes of absence [12]. Spells with a break of ≥1 day were regarded as separate episodes. Absence due to maternity leave was excluded.

In each group, sickness absence was followed-up in the period 1998–2001. Employers were obliged to pay 70% of the salary of the employee during the first year of sick leave (which was supplemented to 100% by the companies included in our study). Dutch sickness absence regulation did not significantly change in the study period. No significant changes in attendance policy or management practice in the companies studied occurred during the study period.

We computed incidence rates of frequent and long-term absence. For frequent and/or long-term absentees, the incidence of frequent and/or long-term absence can be considered as recurrence.

Incidence rate can be calculated using work-years:

$$\text{Incidence rate} = \frac{\text{Number of new events in a specified period}}{\text{Number of work-years}}.$$

The total number of new episodes of long-term absence in the period 1998–2001 were counted, resulting in values ranging from 0 to 6. Long-term absence incidence rates were computed by dividing the sum of these episodes by the number of work-years. The number of years with four or more episodes of absence (frequent absence) in the period 1998 to 2001 were counted, with values ranging from 0 to 4 years. Frequent absence incidence rates were computed by dividing the sum of the years with frequent absence by the number of work-years. The number of work-years was computed by dividing the sum of months until the end of the study period or until employees resigned their employment or reached the disability pension date (after 1 year of sickness absence) by 12. Sickness absence periods <1 year were included in the work-years. In order to determine the first year of absence, the duration of absences which succeed each other with a recovery period of <28 days was summed. The work-years of an employee who was absent for 1 year and terminated their employment afterwards were cut-off after 1 year of absence. Dutch law prohibits dismissal of an employee who is absent due to sickness during the first 2 years of sick leave. Therefore, no dismissal due to absence was possible, except for the situations in which the absent employees resigned work themselves.

We compared the sickness absence percentage with Dutch sickness absenteeism statistics [12]. The sickness absence percentage in a year is computed by dividing the number of calendar days absent corrected for partial work resumption in that year by the number of days employed in the same year. The absence percentage concerns the first year of sickness absence. The number of days absent and the days employed after 1 year of sickness absence are excluded from the numerator and the denominator, respectively.

The analysis was performed in SPSS version 15.0. We performed a log-rate analysis with the rates of frequent and long-term absence as dependent variables and prior absence as explaining variable, adjusting for the employee and function characteristics mentioned below. The analyses resulted in rate ratios (RR) and their 95% confidence interval (CI).

Adjustment was made for gender, age (<35, 35–44, 45–54 years), marital status (married/not married) and workplace urbanization level (rural/urban). An urban region encompasses at least 1500 addresses/km² and a rural region encompasses fewer than 1500 addresses/km². Therefore, the urbanization level of the place where the company was located was dichotomized into high (≥ 1500 addresses/km²) versus low (<1500 addresses/km²).

We also adjusted for function characteristics such as company, seniority (<5, 5–9, 10–14, 15–19, ≥ 20 years), working full-time or part-time and salary level: 1–2 (up to EUR 1570 gross monthly), 3 (EUR 1722 gross monthly), 4–5 (up to EUR 1927 gross monthly), 6–7 (up to EUR 2275 gross monthly) and ≥ 8 (EUR 2540 gross monthly) as registered in 1997.

Ethical approval was sought from the Medical Ethics Committee of the University Medical Center Groningen, who advised that according to Dutch law ethical clearance was not required for this retrospective study on sickness absence charts.

Results

The total population comprised 58 869 employees, but with the exclusion of employees aged 55 and older in 1997 and employees who reached disability pension in 1997, a total of 53 990 employees were included in analyses.

In the base year, 4126 employees were frequent absentees, 3585 were long-term absentees and 979 employees had combined frequent and long-term absence. The remaining 45 300 employees were regarded as the reference group.

The characteristics of the study groups are presented in Table 1. In almost all aspects, the previously absent groups differed significantly from the reference population, apart from age and marital status in the combined group and urbanization level in long-term absentees. Long-term absentees were significantly older, more often married, employed in lower salary scales, working part-time, working in a rural workplace and with a higher seniority compared to frequent absentees.

The mean age of our study population (mean = 40, SD = 7.9) was higher than the mean age of 36 years in the 1997 general working population in the Netherlands [12]. The percentage of male employees (70%) was higher as compared to the total working population in the Netherlands (62%).

In the study population, the absence percentage increased from 4.2% in 1997 to 6.9% in 2001. This is

Table 1. Characteristics of the study groups

	Frequent absentees		Long-term absentees		Frequent and long-term absentees		Reference population	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Men	2476	60	2161	60	542	55	32 870	73
Women	1650	40	1424	40	437	45	12 430	27
Age								
<35 years	1300	32	696	19	238	24	12 039	27
35–44 years	1705	41	1387	39	394	40	17 844	39
45–54 years	1121	27	1502	42	347	35	15 417	34
Unmarried	1684	41	954	27	316	32	15 061	33
Married	2442	59	2631	73	663	68	30 239	67
Salary scale 1–2	205	5	205	6	46	5	2360	5
Salary scale 3	987	24	1316	37	307	31	10 493	23
Salary scale 4–5	1287	31	929	26	306	31	9981	22
Salary scale 6–7	1132	27	789	22	236	24	12 899	28
Salary scale 8+	513	12	344	10	82	8	9548	21
Full-time	2815	68	2306	64	634	65	33 578	74
Part-time	1311	32	1279	36	345	35	11 722	26
Rural workplace	797	19	943	26	209	21	11 258	25
Urban workplace	3329	81	2642	74	770	79	34 042	75
Seniority								
<5 years	569	14	241	7	73	7	5548	12
5–9 years	1055	26	764	21	261	27	9817	22
10–14 years	730	18	626	17	161	16	7314	16
15–19 years	823	20	767	21	201	21	9056	20
≥ 20 years	949	23	1187	33	283	29	13 565	30
Total	4126	100%	3585	100%	979	100%	45 300	100%

a sharper increase than the national Dutch increase of 4.6–5.4% according to the Central Statistical Office [12].

In the follow-up period, the contribution of long-term absence to the total number of absence days was 64%, of frequent absence 7% and of frequent and long-term absence 10%. The distribution of frequent and long-term absence in the follow-up period was 59% no frequent or long-term absence, 20% only long-term absence, 10% only frequent absence and 11% frequent and long-term absence. About one-third of those with long-term absence showed at least 1 year with frequent absence and about half of those with frequent absence showed a long-term absence.

Usually, absent employees are seen by the occupational physician in the second or third week of absence. In the follow-up period, ~50% of all absences and 80% of the long-term absences were medically certified, as measured by the presence of a diagnostic code. Possibly, more absences were seen by the occupational physician, but this could not be recovered from our data.

Table 2 shows the rates of frequent and long-term absence among men and women by age.

Table 2. Rates of frequent and long-term absence in the follow-up period by gender and age

Age	Years at risk		Incidence rate			
			Frequent absence ^a		Long-term absence ^b	
	Men	Women	Men	Women	Men	Women
<35 years	28 455	17 496	8.5	14.7	7.0	17.6
35–44 years	56 000	19 658	8.2	12.8	10.5	16.5
45–54 years	50 962	15 613	6.9	10.8	12.6	19.7
Total	135 417	52 767	7.8	12.8	10.6	17.8

^aNumber of years with frequent absence per 100 work-years.

^bNumber of long-term absences per 100 work-years.

All incidence rates differed significantly by gender and age, except for frequent absence in men younger than 45 years. In the follow-up period, women were absent more frequently and for longer than men. The rate of frequent absence decreased with age. With increasing age, the long-term absence rate increased in men. Women >45 years had a higher long-term absence rate than younger women.

Table 3 shows the rates of frequent and long-term absence for men and women in the study groups.

Frequent absentees had a significantly higher recurrence of both frequent and long-term absence. In about one-third of the work-years thereafter a year with frequent absence recurred, and in about a quarter of the work-years, a year with long-term absence occurred. Except in the combined group, the recurrence risks were significantly higher in women than in men. Long-term absentees had higher rates of recurrent long-term absence: 23.7 per 100 work-years in men and 28.0 in women. In long-term absent employees, the rate of frequent absence was higher than in the reference population.

In Table 4, the proportion of recurrence in different years is presented. In all prior absent groups, the recurrence of frequent and long-term absence is increased, amounting to a total of 61% recurrence in frequent absentees. In later years, the recurrence was lower than in earlier years.

The RR of absence in the follow-up period by prior absence are presented in Table 5.

Employees with prior absence had higher rates of frequent and long-term absence as compared to the reference population. Previously frequent absentees showed an increased risk of future long-term absence and vice versa.

Discussion

Employees with prior frequent or long-term absence, remain at increased risk of sickness absence for a long

Table 3. Incidence rates of frequent and long-term absence in the follow-up period in the study groups by gender

Study groups	Years at risk		Incidence rate			
			Frequent absence ^a		Long-term absence ^b	
	Men	Women	Men	Women	Men	Women
Frequent absentees	8440	5200	32.7	38.6	20.2	27.3
Long-term absentees	6647	3935	10.4	12.8	23.7	28.0
Frequent and long-term absentees	1608	1155	30.7	33.9	34.3	37.2
Reference population	118 722	42 478	5.5	9.1	8.8	15.2
Total	135 417	52 767	7.8	12.8	10.6	17.8

^aNumber of years with frequent absence per 100 work-years.

^bNumber of long-term absences per 100 work-years.

Table 4. Incidence of frequent and long-term absence in the study groups.

Study groups	Frequent absentees		Long-term absentees		Frequent and long-term absentees		Reference population	
	Frequent absence (%)	Long-term absence (%)	Frequent absence (%)	Long-term absence (%)	Frequent absence (%)	Long-term absence (%)	Frequent absence (%)	Long-term absence (%)
1998	39	19	9	19	26	27	6	8
1999	31	19	10	18	29	25	6	9
2000	25	17	8	16	20	22	6	9
2001	20	15	5	14	15	16	5	9
Total	61	50	22	48	51	59	16	28

period. The combination of frequent and long-term absence results in an even higher risk of recurrence. The figures presented give a good description of the population at risk of recurrent absence. By censoring employees who resigned their employment or claimed disability pension after 1 year of absence, the rates presented are an accurate approximation of the true rates. Because postal and telecommunications companies were studied, results are not representative for the entire Dutch workforce. The mean age and the proportion of men were higher as compared to the total working population in the Netherlands. A strength of the study is that it is based on a considerable sample size of employees with various occupational activities (heavy physical labour, back office, technique, sales, IT and executive functions), employed nationwide. Moreover, the sickness absence data were derived from registers rather than self-rated. Possible bias due to loss to follow-up (13%) was restricted.

Blank and Diderichsen [16] reported that persons with repeated short sickness absence spells had a 10-fold greater probability of following the same patterns in the following year. Although the relations we found are not as strong, our results confirm that frequent absence can be interpreted as a behaviour pattern.

Our finding that prior absence predicted future frequent and long-term absence confirms that frequency and duration of absence are not independent. The same factors (e.g. subjective health, working conditions, financial difficulties, smoking) proved to be related to repeated short spells and long spells, suggesting a common mechanism in explaining both outcomes [16]. However, even in a longitudinal study, the baseline variables have a history and for events with a strong episodic nature it will always remain difficult to point at cause or effect. More research within subgroups at risk may reveal the specific reasons for recurrent absence.

Frequent absence is not only an important predictor for recurrent frequent absence but also a prognostic factor for long-term absence. Once absent frequently, the risk of long-term absence increased to 20 per 100 work-years in men and 27 per 100 work-years in women. Therefore, we cannot conclude from our study that frequent absence

does serve as a coping strategy to prevent long-term absence [17]. On the contrary, it is rather a signal for future long-term absence.

Our results indicated that prior long-term absence predicted future long-term absence, in line with other studies which reported that long-term absence in a certain year resulted in longer periods of absence in subsequent years [7,11,14]. Male long-term absentees were 1.9 times more likely to relapse into long-term absence, and female long-term absentees 1.4 times.

Among frequent absentees, the recurrence of frequent absence was ~60% during a 4-year follow-up and among long-term absentees the risk of recurrent long-term absence was ~50%. Frequent absentees had a 50% chance of long-term absence. A Dutch study reported a sick leave recurrence of musculoskeletal complaints of ~30% during 6-month follow-up [21]. Another Dutch study found a 30% recurrence of those between 2 and 6 weeks on sick leave due to musculoskeletal disorders during 12-month follow-up [15]. Wasiak *et al.* [22,23] reported a rate of recurrent work disability of 17% for work-related low back injuries in New Hampshire during a 3-year follow-up. Social legislation and benefits may be factors in explaining the different findings in the Netherlands and the US.

The proportion of recurrence declined over the years. This can be due to an extinction effect or to a differential loss to follow-up (with the population at risk having a higher chance of terminating the employment). In order to meet the differential loss to follow-up, we analysed incidence rates instead of cumulative incidences.

In contrast to Gimeno *et al.* [3], who reported higher sickness absence percentages in men than in women in the Netherlands, but in line with Dutch national statistics on sickness absence [12], we found a higher incidence of frequent and long-term absence in women than in men. The low response rate and the use of self-rated information instead of absence registers may have biased the results of Gimeno *et al.* [3].

Older employees had higher rates of long-term absence, which corresponds to earlier results. Our results confirm that elderly people are absent less frequently, but

Table 5. RR of frequent and long-term absence in the follow-up period in the study groups by gender

Study groups	Frequent absence				Long-term absence							
	Men		Women		Men		Women					
	B	SE	RR (95% CI)	B	SE	RR (95% CI)	B	SE	RR (95% CI)			
Frequent absentees	1.58	0.02	4.9 (4.7–5.1)	1.17	0.03	3.2 (3.0–3.4)	0.66	0.03	1.9 (1.8–2.0)	0.40	0.03	1.5 (1.4–1.6)
Long-term absentees	0.40	0.04	1.5 (1.4–1.6)	0.14	0.05	1.1 (1.0–1.3)	0.64	0.03	1.9 (1.8–2.0)	0.34	0.03	1.4 (1.3–1.5)
Frequent and long-term absentees	1.08	0.05	2.9 (2.7–3.2)	0.58	0.05	1.8 (1.6–2.0)	0.68	0.04	2.0 (1.8–2.1)	0.16	0.05	1.2 (1.1–1.3)
Reference population			1.0			1.0			1.0			1.0

Presented are the parameters (B) and standard errors (SE) which indicate the relative importance (higher values correspond with more importance) of prior absence in effect on recurrent frequent and long-term absence, after adjustment for age, civil status, urban/rural workplace, full-time/part-time, salary scale, seniority and company.

for a longer period of time [8,9,11–14,16]. This suggests that age-conscious staff policies are important in the prevention of dropping out in an ageing working population. Probably, the reasons for absence differ with age [24]. In older employees, health problems or highly demanding jobs may be more important in explaining their high long-term absence.

Frequent absence is more common among young employees and may be a predictor for more serious outcomes [16]. In younger employees, a lower commitment to the organization, no match in work and completed education, low job satisfaction and the combination of work and private life might explain most of their absence. However, more research is needed to resolve this matter. Also, we should be careful to identify a specific age group, since without a clear trend over age groups this information is difficult to interpret.

We researched the relation between prior absence and future absence, but we could not gather information about health and work conditions. Our study, however, adds evidence to instruments assessing the risk of sickness absence [25]. Future research is needed to ascertain whether health- or work-related factors relate to the recurrence risk of sickness absence. It is important to research in more detail how employees who have no risk of absence can be distinguished from those who are at increased risk of either frequent and/or long-term absence concerning health, chronic disorders, coping capability and involvement in their job.

Key points

- Employees with prior frequent and/or long-term absence remain at risk of recurrent absence for a long period of time.
- Prior frequent absence is not only a predictor for recurrent frequent absence but also a prognostic factor for long-term absence.
- Long-term absentees had higher rates of recurrent long duration sickness absence.

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Conflicts of interest

None declared.

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