Original article

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Length of sickness absence and sustained return-to-work in mental disorders and musculoskeletal diseases: a cohort study of public sector employees

by Johanna Kausto, PhD,[1] Jaana Pentti, BSc,[2, 3] Tuula Oksanen, MD, PhD,[2] Lauri J Virta, MD, PhD,[4] Marianna Virtanen, Prof,[1] Mika Kivimäki, Prof,[1, 5] Jussi Vahtera, Prof [6]

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Objectives The aim of this study was to investigate the association between the length of sickness absence and sustained return to work (SRTW) and the predictors of SRTW in depression, anxiety disorders, intervertebral disc disorders, and back pain in a population-based cohort of employees in the Finnish public sector.

Methods We linked data from employers' registers and four national population registers. Cox proportional hazards regression analysis with a cluster option was applied. SRTW was defined as the end of the sickness benefit period not followed by a recurrent sickness benefit period in 30 days.

Results For depression, the median time to SRTW was 46 and 38 days among men and women, respectively. For anxiety disorders, the figures were 24 and 22 days, for intervertebral disc disorders, 42 and 41 days, and, for back pain, 21 and 22 days among men and women respectively. Higher age and the persistence of the health problem predicted longer time to SRTW throughout the diagnostic categories. Comorbid conditions predicted longer time to SRTW in depression and back pain among women.

Conclusions This large cohort study adds scientific evidence on the length of sickness absence and SRTW in four important diagnostic categories among public sector employees in Finland. Further research taking into account, eg, features of the work environment is suggested. Recommendations on the length of sickness absence at this point should be based on expert opinion and supplemented with research findings.

Key terms evidence-based practice; Finland; population register; practice guideline; RTW; sick leave; successful return to work.

Prescribing sick leave is one of the most frequently used procedures in healthcare. In Finland, a Nordic country with a 2.6 million working population, the Social Insurance Institution of Finland compensated 14.4 million medically certified sickness benefit days in 2015 corresponding to a cost of 826 million euros (1). Of the compensated sickness benefit days, 32% were related to musculoskeletal diseases and 26% to mental disorders. In these categories, depression and back pain were among the most frequent causes of compensated work absence. A cautious estimate of the average overall cost of absenteeism to a nation is 2.2% of GDP (2).

Sickness absence is not only costly for the organizations and the society, but also for the individual. It is known from previous studies that long-term sickness absence is a prognostic marker of future absence from work, early retirement due to ill health, and mortality (3–9). Long-term sickness absence is also associated with future unemployment, financial difficulties, psychological and social problems, and social exclusion (10–12). On the other hand, there is evidence that staying active, eg, in case of low-back pain, promotes recovery (13). Since a timely return to work both reduces expenses from sickness benefits and prevents long-term work disability, it

1 Finnish Institute of Occupational Health, Helsinki, Finland.
2 Finnish Institute of Occupational Health, Turku, Finland,
3 University of Helsinki, Helsinki, Finland.
4 The Social Insurance Institution of Finland, Turku, Finland.
5 Clinicum, Faculty of Medicine, University of Helsinki, Helsinki, Finland.
6 Department of Public Health, University of Turku and Turku University Hospital, Turku, Finland.

Correspondence to: Johanna Kausto, Finnish Institute of Occupational Health, PL 40, 00251 Helsinki, Finland. [E-mail: Johanna.Kausto@ttl.fi]

would be important to pay attention to the length of sickness absences and encourage return to work.

In several countries, for example Sweden, certifying physicians are provided with recommendations for the assessment of the need and the duration of sickness absence (14, 15). The guidelines mostly stem from expert consensus, since prescribing sick leave has not been evidence-based as many other medical procedures or recommendations are, regardless of the seriousness of the related public health problem (16). A limitation of studies on the length of sickness absence preceding sustained return to work (SRTW) is that they have typically been carried out among participants who already at the beginning of the study had been absent from work for a longer period of time (17–21). Also, the majority of the RTW studies originate from one country, namely the Netherlands, which limits the generalizability of the findings.

The aim of this study was to add scientific evidence on the associations between the length of sickness absence and SRTW in Finland. We investigated the length of sickness absence from the initial day of absence until SRTW and the predictive factors of SRTW. We studied sickness absences lasting ≥10 weekdays in four diagnostic categories in a large cohort of Finnish public sector employees. We modelled the cumulative probability of SRTW in the different diagnostic categories adjusting for sociodemographic factors, the persistence of the health problem and comorbid conditions.

Methods

Population and data sources

The public sector is a significant employer and a branch of industry in Finland engaging currently more than half a million employees. The study cohort consisted of participants of the Finnish Public Sector Study. This study is the largest follow-up study of public sector employees in Finland representing 20% of the country's public sector employees (22). The eligible population worked in ten municipalities and six hospital districts. In the current analysis, we focused on those employees who were working on 1 January 2005 (N=123 506).

Employers' registers provided information on sociodemographic factors of the participants. Data on medically certified compensated sickness benefit periods were drawn from the national Sickness Insurance Register. The Finnish national sickness benefit scheme (23) compensates for work incapacity due to illness after the employer period of ten weekdays. All non-retired citizens aged 16–67 are eligible for the benefit. Compensation for lost income is based on annual earnings of the individual and the maximum length of the compensation period per disease is 300 weekdays in two years. The Sickness Insurance Register provides the starting and the ending dates for medically certified and compensated sickness absence periods with International Classification of Diseases (ICD-10) codes. Of all 169 330 compensated sickness absence periods in 2005–2011, 419 (0.2%) were lacking ICD–10 codes. These cases were categorized as "other causes". Data on reimbursed medication purchases with codes from the Anatomical Therapeutic Chemical (ATC) classification system were obtained from the Drug Reimbursement Register. The Special Refund Entitlement Register includes information on individuals who are entitled to a specific refund for medication purchases due to certain severe and long-lasting conditions. The Hospital Discharge Register provided data on hospitalization periods (dates and ICD-10 codes). Of all 169 330 compensated sickness absence periods in 2005–2011, 1368 (0.8%) were preceded by a hospitalization period for ICD-10 F-diagnoses and 11 103 (6.6%) by a hospitalization period for ICD-10 M-diagnoses. Data from these distinct registers were combined on the basis of personal social security numbers of the participants.

Sustained return to work (SRTW)

The observational unit in the analysis was a medically certified and compensated sickness absence period in depression (F32, F33, and F34), anxiety disorders (F40, F41, F42 and F43), intervertebral disc disorders (M51) or back pain (M54). Each sickness absence period was computed as starting from the beginning of the employer period (the initial day of work absence) until the end of the compensation period (ie, adding ten weekdays to each compensated sickness absence period). Following regulations of the Finnish National Health Insurance, two consecutive sickness absence periods with same diagnosis were regarded as one if the working period in between the two work absence periods lasted <30 calendar days. Sickness absence periods that were <10 days (ie, not compensated) were not available in the data. SRTW was defined as the end of the sickness benefit period that was not followed by a recurrent sickness absence period for same diagnosis in 30 days. Out of all sickness absence periods in the data after year 2007 (when partial sickness benefit was first introduced in Finland), 1232 (0.6%) were partial sick leaves. Partial and full sickness absence periods were not differentiated in the analyses.

Baseline characteristics

Employers' registers provided information on participants' sex, age and occupation (in 2004 or during the latest employment in the public sector). Occupation was categorized into four main categories according to

the International Standard Classification of Occupations (ISCO): (i) managers and professionals (ISCO 1-2), (ii) associate professionals and clerks (ISCO 3-4), (iii) service and care workers (ISCO 5), and (iv) manual workers (ISCO 6-9). In order to adjust for possible regional differences in sick leave prescribing practices, sickness absence behavior, and the social context, information on the geographical location (region) of the participants work organization at the start of the follow-up was included in the analyses, categorized into Southern, Central and Northern Finland.

Persistence of the health problem was estimated with previous sickness absences and previous notifications of mental disorders or musculoskeletal diseases. Previous sickness absences were calculated during the previous year due to mental disorders (ICD-10 F), musculoskeletal diseases (ICD-10 M) or other causes (no/yes). Previous notifications of mental disorders or musculoskeletal diseases were evaluated as purchases of antidepressants (ATC classification system code N06A) or hospitalization due to mental disorders (no/yes); reimbursed purchases of medication for musculoskeletal pain (ATC classification system codes M01 (anti-inflammatory and anti-rheumatic products), M03 (muscle relaxants) and/or N02 (analgesics)) or hospitalization for musculoskeletal diseases. Purchases of medication and hospitalization periods were recorded during the sickness absence period under study, in the preceding 30 days and during the following 7 days after the sickness absence period. Comorbid conditions were assessed as entitlement to special reimbursements (due to diabetes, rheumatoid arthritis, asthma/COPD or coronary heart disease) at the beginning of the sickness absence period (no/yes).

Statistical analysis

Survival analysis (Cox proportional hazards model with a cluster option) was applied to estimate hazard ratios (HR) with 95% confidence intervals (95% CI) for SRTW and time (calendar days) from the beginning of sickness absence episode (2005–2011) to SRTW. This method allowed us to take into account the intra-individual correlation of sickness absence periods by using sandwich variance estimates in calculating standard errors. Observations were right censored in case of disability pension, old age pension, death and end of the follow up (31 December 2011). Kaplan-Meier curves were obtained to present a visual comparison of SRTW between diagnostic groups. Analyses were carried out separately for men and women. The SAS 9.4 statistical package was used for all analyses (SAS Institute Inc, Cary, NC, USA).

Results

The baseline characteristics of the study participants are presented in table 1. Of the participants, 76% were women. The distributions of age and occupational position followed the characteristics of the public sector in Finland among both men and women. Between 2005 and 2011, 5% of the men and 9% of the women were prescribed sick leave due to depression. For anxiety disorders, the respective figures were 4% and 9%, 2% among both sexes for intervertebral disc disorders, and 6% and 8%, among men and women respectively for back pain.

Of sickness absence periods compensated during the follow-up due to depression, 80% were associated with SRTW. For anxiety disorders, the respective figure was 93%, for intervertebral disc disorders 84% and for back pain 92%. Figure 1 shows a comparison of the unadjusted cumulative probability of SRTW in different diagnostic categories. Among men with depression, 50% of sickness absence periods had resulted in a SRTW in 46 days [interquartile range (IQR) 24–117]. Among women, the corresponding figures were 38 days (IQR 21–88). Among men with anxiety disorders, 50% of sickness absence periods had resulted in a SRTW in 24 days (IQR 17–45). And among women, correspondingly in 22 days (IQR 16–39). For intervertebral disc disorders, the corresponding figures were 42 days (IQR 21–91) among men and 41 days (IQR 20–84) among women. For back pain, 21 days (IQR 15–39) and 22 days (IQR 15–42), respectively.

Table 2 displays associations between baseline

Table 1. Participants' (N=123 506) characteristics by sex.

	Men (N=29 997) [a]		Women (N=93 509) [b]	
	N	%	N	%
Age (years)				
18–35	8069	26.9	26 133	28.0
36–45	9284	31.0	28 296	30.2
46–55	8352	27.8	26 907	28.8
≥56	4292	14.3	12 173	13.0
Occupational group [c]				
Managers and professionals	11 236	37.5	26 989	28.9
Associate professionals and clerks	6135	20.5	31 050	33.2
Service and care workers	3184	10.7	22 911	24.5
Manual workers	9375	31.3	12 527	13.4
Region				
Southern Finland	15 672	52.3	51 261	54.8
Central Finland	8893	29.7	27 784	29.7
Northern Finland	5432	18.0	14 464	15.5
Diagnostic category (ICD–10) (2005–11)				
Depression (F32, F33, F34)	1628	5.4	8392	9.0
Anxiety disorders (F40, F41, F42, F43)	1231	4.1	8067	8.6
Intervertebral disc disorders (M51)	642	2.1	1978	2.1
Back Pain (M54)	1773	5.9	7700	8.2

[a] Mean age 43.1 (SD 10.2) years.
[b] Mean age 42.7 (SD 10.3) years.
[c] Missing N=99.

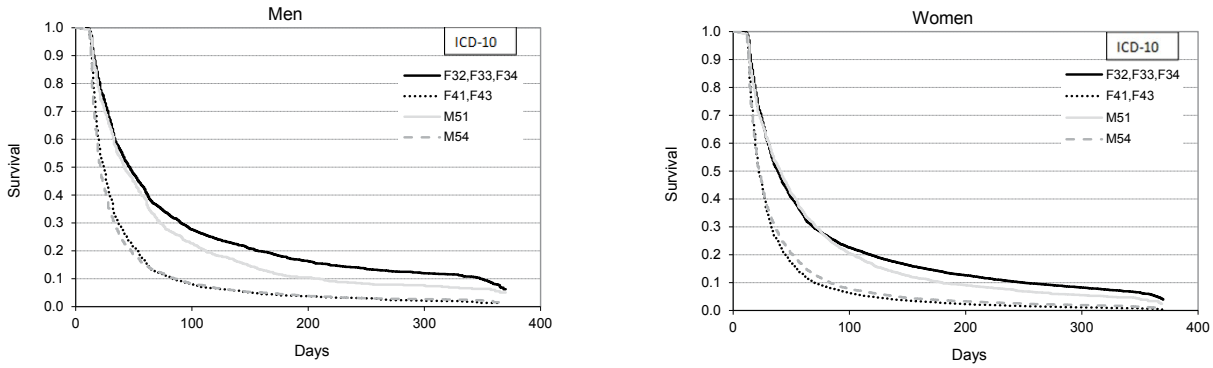

Figure 1. Sustained return to work by diagnostic category and sex (unadjusted) (Kaplan-Meier analysis).

characteristics and SRTW in depression (full models). Median time until SRTW ranged from 33–57 days among men and 31–40 days among women, depending on the age-group, longer time to SRTW being associated with higher age (>46 years). The persistence of the health problem in both sexes and living in Northern Finland and comorbidity among women were also associated with longer time until SRTW. When belonging to the category of the lowest probability of SRTW in respect to all baseline characteristics, median time until SRTW was 95 among men and 144 days among women (data not shown).

For anxiety disorders, median time until SRTW ranged from 22–27 days among men, depending on the age-group (appendix, table A, www.sjweh.fi/index.php?page=data-repository). Among men, higher age and persistence of the health problem were associated with longer time until SRTW. Among women, the correspondent factors were living in Northern Finland and persistence of the health problem. Office work in both sexes and service and care work among women tended to shorten the time until SRTW. When belonging to the category of the lowest probability of SRTW with respect to all baseline characteristics, median time until SRTW in anxiety disorders was 42 and 43 days among men and women, respectively (data not shown).

Median time until SRTW in men with intervertebral disc disorders was 30 days among the youngest participants and 38 days among those >56 years. Among men, none of the baseline characteristics were associated with the length of sickness absence until SRTW except for manual work (table 3). In men, there were too few cases and not enough statistical power in the case of two indicators of the persistence of the health problem. Among women with intervertebral disc disorders, median time until SRTW was 35 days among the youngest participants and 43 days among those >56 years. In addition, manual work and the persistence of the health problem were associated with longer time until SRTW. Women living in Central Finland tended to return to work in a shorter time period than those living in the other parts of the country. When belonging to the category of the lowest probability of SRTW with respect to all baseline characteristics, median time until SRTW was 90 and 102 days among men and women, respectively (data not shown).

Among men with back pain, median time until SRTW was 18 days among the youngest participants and 20 days among those >56 years. Among women, median time until SRTW was 20 days or 21 days depending on the age-group (Appendix, table B). For men, manual work and the persistence of the health problem and for women, also service and care work were associated with longer time until SRTW. The length of sickness absence until SRTW tended to be shorter among men with comorbid conditions and longer among women. When belonging to the category of the lowest probability of SRTW with respect to all baseline characteristics, median time until SRTW in back pain was 26 among men and 40 days among women (data not shown).

Discussion

This large cohort study showed that the unadjusted median time to SRTW was 21–46 days among men and 22–41 days among women depending on the diagnosis. For back pain and anxiety disorders, employees succeeded in returning to work in a shorter time than in the case of depression and intervertebral disc disorders. There were no notable differences in time to SRTW between men and women except for depression. The length of sickness absence tended to be shorter for women than men with depression. It is possible that men and women are treated differently or they may differ in compliance as regards treatment of depression. It is also likely that men seek medical help for the symptoms of depression at a later stage than women. Older age was

Table 2. Hazard ratios (HR) for determinants and time to first sustained return to work (SRTW) (Cox proportional hazards model with a cluster option). [95% CI=95% confidence interval; ATC=anatomical therapeutic chemical classification; SA=sickness absence]

Baseline characteristics	Depression (ICD-10) F32, F33 and F34					
				Days until SRTW [a] (percentiles)		
	N	HR	95% CI	25th	50th	75th
Men (N=2217)						
Age						
18–35	271	1.08	0.94–1.24	20	33	72
36–45	693	Ref		20	36	80
46–55	843	0.82	0.73–0.91	23	45	111
≥56	410	0.66	0.57– 0.76	27	57	168
Occupational group						
Managers and professionals	653	Ref		20	36	80
Associate professionals and clerks	508	1.00	0.88–1.14	20	36	80
Service and care workers	344	1.06	0.91–1.24	20	34	73
Manual workers	710	0.91	0.81–1.03	21	40	91
Region						
Southern Finland	1171	Ref		20	36	80
Central Finland	639	1.05	0.95–1.17	20	34	74
Northern Finland	407	0.94	0.82–1.08	20	39	88
Persistence of health problem						
Sickness absence during previous year (ICD–10 F)						
No	1619	Ref		20	36	80
Yes	598	0.93	0.84–1.03	21	39	89
Sickness absence during previous year (ICD–10 M)						
No	2050	Ref		20	36	80
Yes	167	0.97	0.81–1.17	20	38	83
Sickness absence during previous year (other causes)						
No	1905	Ref		20	36	80
Yes	312	0.98	0.87–1.11	20	37	82
Purchase of antidepressants [b] or hospitalization period for mental disorders [c]						
No	1641	Ref		20	36	80
Yes	576	0.82	0.74–0.91	23	45	109
Reimbursed purchase of medication for musculoskeletal pain [d] or hospitalization period for musculoskeletal diseases [c]						
No	2037	Ref		20	36	80
Yes	180	1.17	0.99–1.37	19	32	63
Comorbidity [e]						
No	1997	Ref		20	36	80
Yes	220	0.93	0.77–1.11	21	39	89
Women (N=11 953)						
Age						
18–35	1658	1.02	0.96–1.09	18	31	61
36–45	3752	Ref		18	32	63
46–55	4340	0.91	0.87–0.96	19	34	73
≥56	2203	0.78	0.73–0.83	20	40	96
Occupational group						
Managers and professionals	2637	Ref		18	32	63
Associate professionals and clerks	4084	1.00	0.96–1.06	18	31	62
Service and care workers	3421	1.04	0.98–1.10	18	31	61
Manual workers	1807	0.93	0.87–1.00	19	33	70
Region						
Southern Finland	6707	Ref		18	32	63
Central Finland	3442	1.05	1.00–1.09	18	31	60
Northern Finland	1804	0.85	0.80–0.90	20	37	82
Persistence of health problem						
Sickness absence during previous year (ICD–10 F)						
No	8579	Ref		18	32	63
Yes	3374	0.89	0.85–0.92	20	35	76
Sickness absence during previous year (ICD–10 M)						
No	10 647	Ref		18	32	63
Yes	1 306	0.89	0.84–0.95	20	35	76
Sickness absence during previous year (other causes)						
No	10 138	Ref		18	32	63
Yes	1815	0.90	0.85–0.94	19	34	75
Purchase of antidepressants [b] or hospitalization period for mental disorders [c]						
No	9113	Ref		18	32	63
Yes	2840	0.86	0.82–0.90	20	36	81
Reimbursed purchase of medication for musculoskeletal pain [d] or hospitalization period for musculoskeletal diseases [c]						
No	10 541	Ref		18	32	63
Yes	1412	0.94	0.89–1.00	19	33	69
Comorbidity [e]						
No	10 700	Ref		18	32	63
Yes	1253	0.90	0.84–0.96	19	34	74

[a] Estimated time to SRTW when in the reference category of other covariates.
[b] ATC: N06A, during: 30 days before – 7 days after the SA-period.
[c] during: 30 days before – 7 days after the sickness absence period.
[d] ATC: M01, M03, N02, during: 30 days before – 7 days after the SA-period.
[e] Entitlement to special reimbursements at the beginning of the sickness absence period (diabetes, rheumatoid arthritis, asthma/COPD, coronary heart disease).

rather consistently associated with longer time to SRTW throughout the diagnostic categories. Pregnancy-related back problems may explain the increased length of sickness absence among younger women with back pain. As for occupational category, longer time to SRTW was required in physically demanding manual and service and care work in musculoskeletal diseases. Persistence of the health problem was rather consistently associated with longer time to SRTW, especially among women. Comorbid conditions predicted longer time to SRTW for depression and back pain among women. This finding is in accordance with earlier results from this same study cohort, which showed that RTW after depression-related work absence was delayed in the presence of other psychiatric or somatic diseases (24).

National diagnosis specific guidelines on the length of sickness absence are currently under consideration in Finland following the example of several other countries. A recent survey among Finnish physicians (25) found, in accordance with corresponding earlier surveys carried out in Sweden and Norway, that some guidance on the length of sickness absence at least in the most

Table 3. Hazard ratios (HR) for determinants and time to first sustained return to work (SRTW) (Cox proportional hazards model with a cluster option). [95% CI=95% confidence interval; ATC=anatomical therapeutic chemical classification; SA=sickness absence]

Baseline characteristics	Intevertebral disc disorders (ICD-10 M51)					
				Days until SRTW [a] (percentiles)		
	N	HR	95% CI	25th	50th	75th
Men (N=825)						
Age						
18–35	130	1.11	0.91–1.35	17	30	58
36–45	237	Ref		18	32	61
46–55	268	0.88	0.72–1.06	19	35	70
≥56	190	0.81	0.65–1.02	20	38	76
Occupational group						
Managers and professionals	165	Ref		18	32	61
Associate professionals and clerks	169	0.84	0.68–1.04	20	37	74
Service and care workers	146	0.86	0.68–1.09	19	36	70
Manual workers	344	0.67	0.54–0.83	23	48	104
Region						
Southern Finland	336	Ref		18	32	61
Central Finland	211	1.12	0.93–1.34	17	30	58
Northern Finland	278	1.09	0.91–1.30	17	31	59
Persistence of health problem						
Sickness absence during previous year (ICD–10 F)						
No	802	Ref		18	32	61
Yes	23	1.00	0.59–1.71	18	32	61
Sickness absence during previous year (ICD–10 M)						
No	501	Ref		18	32	61
Yes	324	0.98	0.84–1.14	18	32	63
Sickness absence during previous year (other causes)						
No	721	Ref		18	32	61
Yes	104	1.12	0.92–1.36	17	30	58
Purchase of antidepressants [b] or hospitalization period for mental disorders [c]						
No	807	Ref		18	32	61
Yes	18	0.68	0.40–1.14	23	47	101
Reimbursed purchase of medication for musculoskeletal pain [d] or hospitalization period for musculoskeletal diseases [c]						
No	362	Ref		18	32	61
Yes	463	0.91	0.78–1.06	19	34	68
Comorbidity [e]						
No	759	Ref		18	32	61
Yes	66	0.93	0.71–1.23	18	34	66
Women (N=2442)						
Age						
18–35	241	1.03	0.90–1.19	18	35	73
36–45	686	Ref		19	37	75
46–55	976	1.05	0.95–1.17	18	34	71
≥56	539	0.84	0.74–0.96	20	43	92
Occupational group						
Managers and professionals	361	Ref		19	37	75
Associate professionals and clerks	846	1.01	0.89–1.14	19	37	75
Service and care workers	778	0.95	0.83–1.07	19	39	81
Manual workers	452	0.84	0.72–0.97	20	44	94
Region						
Southern Finland	1 110	Ref		19	37	75
Central Finland	694	1.16	1.05–1.28	17	32	64
Northern Finland	638	1.00	0.89–1.12	19	37	75
Persistence of health problem						
Sickness absence during previous year (ICD–10 F)						
No	2 344	Ref		19	37	75
Yes	98	0.95	0.76 –1.18	19	39	81
Sickness absence during previous year (ICD–10 M)						
No	1 349	Ref		19	37	75
Yes	1 093	0.89	0.82–0.97	20	41	87
Sickness absence during previous year (other causes)						
No	2 115	Ref		19	37	75
Yes	327	0.90	0.80–1.02	19	41	84
Purchase of antidepressants [b] or hospitalization period for mental disorders [c]						
No	2 335	Ref		19	37	75
Yes	107	0.73	0.60–0.88	22	51	113
Reimbursed purchase of medication for musculoskeletal pain [d] or hospitalization period for musculoskeletal diseases [c]						
No	1 086	Ref		19	37	75
Yes	1 356	1.02	0.93–1.11	18	36	74
Comorbidity [e]						
No	2 096	Ref		19	37	75
Yes	346	1.00	0.88–1.13	19	37	75

[a] Estimated time to SRTW when in the reference category of other covariates.
[b] ATC: N06A, during: 30 days before – 7 days after the SA-period.
[c] during: 30 days before – 7 days after the sickness absence period.
[d] ATC: M01, M03, N02, during: 30 days before – 7 days after the SA-period.
[e] Entitlement to special reimbursements at the beginning of the sickness absence period (diabetes, rheumatoid arthritis, asthma/COPD, coronary heart disease).

important diagnostic categories is needed. The existing guidelines mostly stem from expert opinion but it has been claimed that the evidence base of these recommendations is unclear (15). This study sought to add scientific evidence for the recommendations on the length of sickness absence in the Finnish context in order to promote SRTW. The analyses were restricted to four large diagnostic categories that are among the most prevalent causes of sickness benefit periods compensated by the Finnish national sickness insurance in Finland.

Direct comparisons of our study with previous studies on SRTW in mental disorders and musculoskeletal diseases are problematic due to differences in study populations and study designs. Most of previous studies concern employees who have at baseline been absent from work for a longer period of time. SRTW is defined varyingly, however often as RTW for at least four or five weeks without recurrence of sickness absence (17, 20, 21, 26–28). In only few of the previous studies findings were reported separately for men and women. To an extent, our findings can be contrasted to the Swedish national expert opinion-based guidelines on the length of work absence

in different diagnostic categories. In depression-related work absence, our findings are congruent with the Swedish recommendations according to which there is large individual variation in the length of sickness absence needed. Our results indicated that especially among women in higher age-groups with a persistent health problem and comorbid conditions, a longer time was needed until SRTW when compared to younger employees with a more transient health condition and with no comorbidities. The Swedish guidelines propose that in mild depression, full time sickness absence is not always necessary, whereas partial sick leave can be considered. In moderate and severe depression, work ability can be reduced up till six months or longer. Because of the way we defined SRTW, we did not differentiate depression (F32) from recurrent depression (F33) or persistent mood disorders (F34) in our analyses.

In adjustment disorders (F43.2), the Swedish guidelines encourage to avoid sickness absence from work if possible. If sick leave is needed for other anxiety disorders (F41), it should be restricted to 2–4 weeks. In our study, median time to SRTW in F40- F43 was roughly 3 weeks, well in line with the Swedish guidelines. In intervertebral disc disorders (M51), we found that median time to SRTW was six weeks (41–42 days). And in back pain (M54) three weeks (21–22 days). Swedish guidelines state that in diagnostic categories of ICD-10 M51 and M54.4 (lumbago with sciatica) in physically light work, work ability can be reduced up till three weeks. In physically demanding work, it takes possibly up to six weeks until work ability is restored. Respectively, in M54.5 (low back pain) the guidelines instruct that work ability can be reduced up till 1 week and 2 weeks. Our results, even though not straight comparable, were in accordance with the Swedish guidelines indicating the importance of the nature of work in musculoskeletal diseases.

We utilized register data combining information from employers' registers and several population registers. Although the study cohort represents a large scale of different occupations in the Finnish public sector, it might not be generalizable to other branches of industry. A limitation is that short, uncompensated sickness absence periods (first ten weekdays of sickness absence) could not be included in the analyses. Thus our results may overestimate the length of sickness absence until SRTW. Another weakness is that we had no information on medical treatment-, condition-, physician- or healthcare-system-related factors, which also have a role in SRTW. We assessed certain chronic diseases, namely, diabetes, rheumatoid arthritis, asthma/COPD or coronary heart disease, based on records of entitlement to special reimbursement for the medication purchases for these diseases. However, it is still possible that we missed some other comorbidities that could have influenced the outcome. The present study provides evidence on how the length of sickness absence until SRTW is associated with the sociodemographic factors, including occupational group, persistence of the health problem and comorbid conditions. Information on these characteristics is rather easily obtainable in an anamnestic interview carried out by the clinician in daily practice. However, it is important to note that RTW depends not only on the disease, individual or health-related factors but also on the private and living conditions, features of the work environment as well as cultural and organizational factors. We were not able to take all these factors into account and more research is needed on this matter. The use of partial sick leave and work modifications in returning to work could not be examined in this study.

In conclusion, this large cohort study adds scientific evidence on the association between the length of sickness absence and SRTW in four important diagnostic categories among public sector employees in Finland. Half of the sickness absence periods resulted in SRTW in 21–46 days depending on the diagnosis behind the work disability in question. In particular, sociodemographic and health-related factors were associated with the length of sickness absence. It is important to interpret these results cautiously because the length of sickness absence is also related to a set of uninvestigated factors, such as the work environment, the nature of the job, and the extent to which the workplace is prepared to accommodate the disability. Certifying physicians in Finland have expressed a need for guidelines concerning the need and length of sickness absence (25). At this point, such guidelines could be based on expert opinion supplemented with research findings, such as the results of this study.

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References

1. Statistical database Kelasto. The Social Insurance Institution of Finland (Internet). [Cited 5 September 2016]. Available from: http://www.kela.fi/web/en/statistical-database-kelasto.

2. Eurofond. Absence from work. Dublin: European Foundation for the Improvement of Living and Working Conditions, 2010 (Internet) [Cited 5 september 2016]. Available from: http://www.eurofound.europa.eu/sites/default/files/ef_files/docs/ewco/tn0911039s/tn0911039s.pdf.

3. Gjesdal S, Ringdal PR, Haug K, Maeland JG. Predictors of

disability pension in long-term sickness absence: results from a population-based and prospective study in Norway 1994-1999. Eur J Public Health 2004 Dec;14(4):398–405. http://dx.doi.org/10.1093/eurpub/14.4.398.

4. Kivimäki M, Forma P, Wikström J, Halmeenmäki T, Pentti J, Elovainio M et al. Sickness absence as a risk marker of future disability pension: the 10-town study. J Epidemiol Community Health 2004 Aug;58(8):710–1. http://dx.doi.org/10.1136/jech.2003.015842.

5. Kivimäki M, Head J, Ferrie JE, Singh-Manoux A, Westerlund H, Vahtera J et al. Sickness absence as a prognostic marker for common chronic conditions: analysis of mortality in the GAZEL study. Occup Environ Med 2008 Dec;65(12):820–6. http://dx.doi.org/10.1136/oem.2007.038398.

6. Vahtera J, Pentti J, Kivimäki M. Sickness absence as a predictor of mortality among male and female employees. J Epidemiol Community Health 2004 Apr;58(4):321–6. http://dx.doi.org/10.1136/jech.2003.011817.

7. Alexanderson K, Kivimäki M, Ferrie JE, Westerlund H, Vahtera J, Singh-Manoux A et al. Diagnosis-specific sick leave as a long-term predictor of disability pension: a 13-year follow-up of the GAZEL cohort study. J Epidemiol Community Health 2012 Feb;66(2):155–9. http://dx.doi.org/10.1136/jech.2010.126789.

8. De Rijk A, Janssen N, Alexanderson K, Nijhuis F. Gender differences in return to work patterns among sickness absentees and their associations with health: a prospective cohort study in The Netherlands. Int J Rehabil Res 2008 Dec;31(4):327–36. http://dx.doi.org/10.1097/MRR.0b013e3282fba37c.

9. Helgesson M, Johansson B, Nordqvist T, Lundberg I, Vingård E. Sickness absence at a young age and later sickness absence, disability pension, death, unemployment and income in native Swedes and immigrants. Eur J Public Health 2015 Aug;25(4):688–92. http://dx.doi.org/10.1093/eurpub/cku250.

10. Backhans M, Fredlund P, Lindholm C. Sociala och ekonomiska konsekvenser av sjukskrivning, in Den höga sjukfrånvaron - problem och lösningar. [The social and economic cosequences of sickness absence in High sickness absence – problems and solutions]. Stockholm: Arbetslivsinstitutet, 2005, p. 245–67.

11. Bryngelson A. Long-term sickness absence and social exclusion. Scand J Public Health 2009 Nov;37(8):839–45. http://dx.doi.org/10.1177/1403494809346871.

12. Wikman A, Wiberg M, Marklund S, Alexanderson K. Activities and sources of income after a period of long-term sick leave--a population-based prospective cohort study. BMC Public Health 2012 Sep;12:745. http://dx.doi.org/10.1186/1471-2458-12-745.

13. van Tulder M, Becker A, Bekkering T, Breen A, del Real MT, Hutchinson A et al.; COST B13 Working Group on Guidelines for the Management of Acute Low Back Pain in Primary Care. Chapter 3. European guidelines for the management of acute nonspecific low back pain in primary care. Eur Spine J 2006 Mar;15 Suppl 2:S169–91. http://dx.doi.org/10.1007/s00586-006-1071-2.

14. Socialstyrelsen. Försäkringsmedicinskt beslutstöd. [Guidelines for medical assessment in the Insurance Medicin]. (Internet) [Cited 5 September 2016]. Available from: http://www.socialstyrelsen.se/riktlinjer/forsakringsmedicinsktbeslutsstod/Sidor/default.aspx#

15. de Boer WE, Mousavi SM, Delclos GL, Benavides FG, Lorente M, Kunz R. Expectation of sickness absence duration: a review on statements and methods used in guidelines in Europe and North America. Eur J Public Health 2016 Apr;26(2):306–11. http://dx.doi.org/10.1093/eurpub/ckv222.

16. Alexanderson K, Hensing G. More and better research needed on sickness absence. Scand J Public Health 2004;32(5):321–3. http://dx.doi.org/10.1080/14034940410019253.

17. Anema JR, Steenstra IA, Bongers PM, de Vet HC, Knol DL, Loisel P et al. Multidisciplinary rehabilitation for subacute low back pain: graded activity or workplace intervention or both? A randomized controlled trial. Spine 2007 Feb;32(3):291–8. http://dx.doi.org/10.1097/01.brs.0000253604.90039.

18. Grøvle L, Haugen AJ, Keller A, Ntvig B, Brox JI, Grotle M. Prognostic factors for return to work in patients with sciatica. Spine J 2013 Dec;13(12):1849–57. http://dx.doi.org/10.1016/j.spinee.2013.07.433.

19. Heymans MW, de Vet HC, Bongers PM, Knol DL, Koes BW, van Mechelen W. The effectiveness of high-intensity versus low-intensity back schools in an occupational setting: a pragmatic randomized controlled trial. Spine 2006 May;31(10):1075–82. http://dx.doi.org/10.1097/01.brs.0000216443.46783.4d.

20. Lambeek LC, van Mechelen W, Knol DL, Loisel P, Anema JR. Randomised controlled trial of integrated care to reduce disability from chronic low back pain in working and private life. BMJ 2010 Mar;340:c1035. http://dx.doi.org/10.1136/bmj.c1035.

21. Myhre K, Marchand GH, Leivseth G, Keller A, Bautz-Holter E, Sandvik L et al. The effect of work-focused rehabilitation among patients with neck and back pain: a randomized controlled trial. Spine 2014 Nov;39(24):1999–2006. http://dx.doi.org/10.1097/BRS.0000000000000610.

22. Kivimäki M, Gimeno D, Ferrie JE, Batty GD, Oksanen T, Jokela M et al. Socioeconomic position, psychosocial work environment and cerebrovascular disease among women: the Finnish public sector study. Int J Epidemiol 2009 Oct;38(5):1265–71. http://dx.doi.org/10.1093/ije/dyn373.

23. Nordic Social-Statistical Committee. Social protection in the Nordic countries 2013/2014: scope, expenditure and financing. Copenhagen: Nordic Social-Statistical Committee, 2015 (Internet) (Cited 5 September 2016). Available from: http://nososco-eng. nom-nos.dk.

24. Ervasti J, Vahtera J, Pentti J, Oksanen T, Ahola K, Kivekäs T et al. Return to work after depression-related absence by employees with and without other health conditions: a cohort study. Psychosom Med 2015 Feb-Mar;77(2):126–35. http://dx.doi.org/10.1097/PSY.0000000000000138.

25. Hinkka K, Niemelä M, Autti-Rämö I, Palomäki H, Pärnänen H, Vänskä J. Sairauspoissaolotarpeen määrittäminen. Kyselytutkimus lääkäreille. [Assessing need for sickness absence. Survey among physicians.] Helsinki: Kela (Social Insurance Institution of Finland), 2016. Kela Työpapereita, no 96.

26. Steenstra IA, Verbeek JH, Heymans MW, Bongers PM. Prognostic factors for duration of sick leave in patients sick listed with acute low back pain: a systematic review of the literature. Occup Environ Med 2005 Dec;62(12):851–60. http://dx.doi.org/10.1136/oem.2004.015842.

27. Hees HL, de Vries G, Koeter MW, Schene AH. Adjuvant occupational therapy improves long-term depression recovery and return-to-work in good health in sick-listed employees with major depression: results of a randomised controlled trial. Occup Environ Med 2013 Apr;70(4):252–60. http://dx.doi.org/10.1136/oemed-2012-100789.

28. Koopmans PC, Bültmann U, Roelen CA, Hoedeman R, van der Klink JJ, Groothoff JW. Recurrence of sickness absence due to common mental disorders. Int Arch Occup Environ Health 2011 Feb;84(2):193–201. http://dx.doi.org/10.1007/s00420-010-0540-4.

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