Original article

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Legislative change enabling use of early part-time sick leave enhanced return to work and work participation in Finland

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Objectives The aim of the study was to assess the effectiveness of the use of part-time sick leave at the early (first 12 weeks) stage of work disability due to mental disorder or musculoskeletal disease on sustained return to work (RTW) and overall work participation.

Methods In a nation-wide register-based quasi-experimental study, we compared sustained RTW (ie, ≥28 consecutive days at work) and 2-year work participation between the part- and full-time sickness absence (SA) benefit groups (N=1878 in each group) using propensity-score matching. Persons who received partial or full SA benefit due to musculoskeletal diseases or mental disorders between January 1, 2010 and December 31, 2011 were eligible as cases or controls, respectively.

Results A higher proportion showed sustained RTW after part- compared to full-time sick leave [absolute risk difference 8.0%, 95% confidence interval (95% CI) 5.3–10.9]. Moreover, the proportion of time at work was at a 10.5% higher level in the part- compared to full-time sick leave group. The prevalence of full disability retirement was almost three-fold among the full- compared to part-time sick leave group, whereas partial disability retirement was 4.5-fold more prevalent in the part- compared to full-time sick leave group.

Conclusions The use of part-time sick leave during the first three months of SA enhances RTW and overall work participation during two years among persons with mental disorders and musculoskeletal diseases. The prescription of part-time sick leave can be recommended at an early stage of work disability.

Key terms legislation; natural experiment; partial sick leave; propensity score; quasi-experiment; rehabilitation; RTW; sickness absence.

Partial sickness allowance is a benefit that enables employees with work disability to be absent from work for rest, treatment, or rehabilitation and still remain working for a proportion of the time. It is used in several countries, including all Nordic countries (1, 2).

A number of studies have been carried out to assess the effectiveness of part-time sick leave. Some studies suggest that part-time sick leave reduces the duration of sickness absence (SA) or enhances return to work (RTW) (3–6), while other studies have shown no effects (7) or prolonged sick leaves (8) after the use of part-time sick leave. Prescribing physician or patient selection mechanisms, ie, factors affecting whether or not part-time sick leave is preferable to full-time sick leave, may explain the findings in some observational studies. Experimental studies using a randomized controlled design are rarely feasible (9). Therefore, quasi-experimental designs have been utilized to be able to control for confounders; these include the use of instrumental variable (5, 7) or propensity score (4, 10), difference in differences (4), or inverse probability weighting and G-computation (6).

Most studies on the effectiveness of part-time sick leave have been carried out in the Nordic countries. While these societies have many similarities, there are differences in the social insurance systems that should be

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kept in mind when comparing the results from different countries. For instance, in Sweden part-time sick leave has for long been the first option in situations where the medical status of the patient does not necessitate full-time sick leave. Indeed, the proportion of part-time sick leaves of all sick leaves has been the highest in Sweden (1). The use of part-time sick leave has been encouraged also in Norway, resulting in its increased use there (11).

In Finland, partial daily allowance to compensate for earnings losses during part-time sick leave was introduced as a benefit as late as 2007. After a 10-day period paid by the employer and a continuous full SA of 60 compensated days (equaling 70 calendar days with 6 days per week being compensated), it was possible to return to work duties for 40–60% of the work hours based on physician's prescription and agreement of the employee and employer. Partial sickness allowance (50% of full allowance) is paid by the Social Insurance Institution (SII) to the employee. To be eligible for part-time sick leave in Finland, an employee has to be assessed by a physician as incapable of performing his or her regular work duties. However, this physician should have further assessed that part-time work would not risk the person's health. It should be emphasized that, in the situation described above, the choice of part- over full-time sick leave is voluntary for the employee. This legislation was changed 1 January 2010, enabling the use of partial sickness benefit immediately after the 10-day period of full SA paid by the employer.

The aim of the present study was to assess the effectiveness of the use of part-time sick leave at the early stage of work disability (after 0–59 compensated days of full SA) on sustained RTW and overall work participation. Contributing to overall work participation, we assessed time spent at work, transitions to full and partial disability retirement as well as unemployment. We restricted our study to mental disorders and musculoskeletal diseases, ie, the diagnostic groups where part-time sick leave has been primarily used.

Methods

The study base consisted of a 70% random sample of the working age population living in Finland on December 31, 2010. Register information on compensated SA periods and other social benefits was obtained from SII and the Finnish Centre for Pensions provided information on work disability benefits, employment and unemployment periods. Demographic information was obtained from the Finnish Longitudinal Employer-Employee Data (FLEED) of Statistics Finland. All data linkages were based on individual social security numbers (unique to each citizen of Finland) that, because of confidentiality, were transformed to research identification codes for the researchers. Register information was searched between January 1, 2008 and December 31, 2013.

A preliminary scrutiny of our data showed that the vast majority (about 80%) of part-time sickness beneficiaries had an immediately preceding full-time sick leave. We therefore chose this group as the cases. We chose the control group from those full-time sickness beneficiaries who continued with a new full-time SA prescription . The time point of deciding on the continuation of the sick leave, as either part- or full-time, was considered as the point of "random assignment" to the part- or full-time sick leave group. The design of the study and the definition of the cases and controls is illustrated in figure 1.

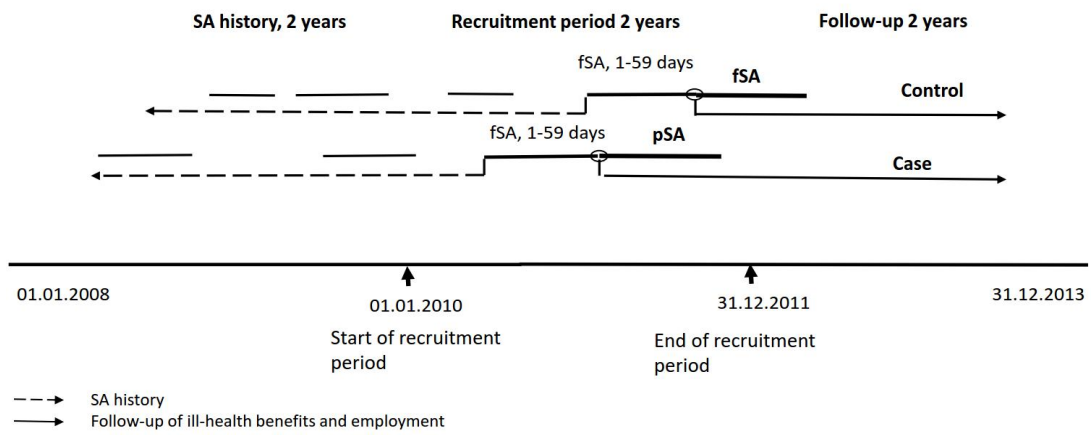

Figure 1. Formation of part- and full-time sick leave study group. [SA=sickness absence, fSA=full-time sickness absence, pSA=part-time sickness absence.]

Cases

Persons whose part-time sick leave due to a musculoskeletal disease (M00-M99 according to ICD-10) or mental disorder (F00-F99) started between January 1, 2010 and December 31, 2011 and had an immediately preceding full-time SA spell of 1–59 compensated days were eligible as cases.

Controls

Persons whose full-time sick leave due to a musculoskeletal disease or mental disorder (ICD-10 diagnoses as above) started between January 1, 2010 and December 31, 2011 and who had a full-time SA spell of 1–59 compensated days immediately preceding the index full-time SA spell and did not receive partial SA benefit between January 1, 2010 and December 31, 2011 were eligible as controls.

From both the cases and controls, we excluded persons who (i) were unemployed or self-employed during the SA spell, (ii) had accumulated >150 full time compensated SA days during the preceding two years, (iii) had accumulated >36 part-time compensated SA days during the preceding two years and (iv) were <20 or >64 years of age.

The limit of maximally 150 days of preceding full SA days during the preceding two years (before the beginning of the full SA spell of 1–59 days) was set to exclude persons who would be close to the 300-day maximum limit of full SA days in Finland. We similarly defined a limit of maximally 36 days of preceding part-time sick leave days to exclude persons who would be close to the 72-day maximum limit of part-time SA days.

Outcomes

Our primary outcome was sustained RTW, defined as returning to regular duties for a minimum of 28 consecutive work days immediately following SA. The follow-up started from the 1st part- or full-time SA day during the recruitment period and continued up to two years.

A secondary outcome was overall work participation during the 2-year follow-up. To examine work participation, we used *daily work participation* statuses: (i) at work (having employment and not receiving any benefit), (ii) on part-time SA or partially retired (receiving partial work disability benefits) while being employed, (iii) on full-time SA while being employed, (iv) receiving ill-health-related benefits (including full and partial rehabilitation subsidy and allowance) while being employed, (v) unemployed, (vi) full disability retirement, and (vii) other (outside the labor force, status not known). We calculated the proportion of time the person spent in each status for each month of the 2-year follow-up. Overall work participation was calculated as the proportion of time within the 2-year follow-up when the participants had an employment contract and did not receive either partial or full ill-health-related benefits (sickness benefits, rehabilitation allowances, disability pensions), or unemployment benefits. It was assumed that when receiving partial ill-health-related benefits, the participants worked half of the work time (which is typically the case in Finland).

The full or partial disability retirement comprised all incident permanent or temporary disability retirements during follow-up. The unemployment comprised all incident unemployment periods during follow-up.

Covariates

Data on gender, dates of birth and death, diagnostic codes (ICD-10), sector of employment, history of SA, employment, and unemployment periods during the preceding two years were obtained from the national sickness insurance register of the SII and the earnings registers of the Finnish Centre for Pensions. Information on nationality at birth, major region, industrial sector, socioeconomic status, and annual gross income in the year preceding the SA was obtained from the Finnish Longitudinal Employer-Employee Data (FLEED) of Statistics Finland. The characteristics of the study groups are presented in appendix 1 (entire sample, www.sjweh.fi/index.php?page=data-repository) and table 1 (matched samples).

Statistical analysis

Propensity score (PS) matching was used to evaluate this quasi-experiment by adjusting for observed factors that may have introduced allocation bias. To compute PS, we conducted a set of hierarchical logistic regressions with observed covariates obtained from the registers [age, major region (dummy variable), employment sector (dichotomous) industrial sector (dummy variable), socioeconomic status (dummy variable), annual gross income in the year preceding the SA, number of SA days and number of days being employed or unemployed (categorical) during the preceding two years] and assignment to the SA group (0=part-time sick leave, 1=full-time sick leave) as a dependent variable. The covariates were entered into the model at the first step and the interaction terms at the second step. To maximize comparability of the part- and full-time sick leave groups, the logistic model was revised several times by including theoretically reasonable interaction and non-linear terms. The fitness of the model was assessed with the Hosmer & Lemeshow test. The analyses were performed within four gender × diagnostic group strata. PS with 1:1 nearest neighbor matching was used to match

Table 1. Characteristics of the propensity score matched study groups by gender.

	Men (N=842)				Women (N=2914)			
	Part-time sick leave (N=421)		Full-time sick leave (N=421)		Part-time sick leave (N=1457)		Full-time sick leave (N=1457)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age (years)	44.6	10.1	45.9	10.1	45.6	9.9	46.9	10.2
Gross income (€)	39 634	17 416	39 499	20 794	31 863	11 989	30 840	13 813
Employment (days) [a]	718	57	715	64	720	51	718	58
Unemployment (days) [a]	16	63	14	51	7	35	9	46
Full sick leave (days) [b]	15.0	28.3	13.8	25.6	19.0	30.0	18.2	31.3
Partial sick leave (days) [b]	0.7	3.9	0.0	0.0	1.0	4.8	0.0	0.0
Immediately preceding full sickness absence (days)	29.8	16.4	25.1	15.4	28.1	17.0	25.8	15.9
	N	%	N	%	N	%	N	%
Diagnostic category								
Mental disorders	188	44.8	188	44.8	644	45.6	644	45.6
Musculoskeletal diseases	233	55.2	233	55.2	793	54.4	793	54.4
Nationality at birth								
Finnish, born in Finland	403	95.7	404	96.0	1414	97.0	1414	97.0
Finnish, born abroad	7	1.7	5	1.2	21	1.4	15	1.0
Foreigner	11	2.6	12	2.9	25	1.5	28	1.9
Major region								
Southern Finland	164	38.9	171	40.6	566	38.8	528	36.2
Western Finland, Åland	97	23.3	99	23.5	314	22.4	340	23.3
Eastern Finland	80	19.0	81	19.2	289	19.8	303	20.8
Northern Finland	80	19.0	70	16.5	275	18.9	286	19.6
Socioeconomic status								
Self-employed persons	3	0.7	21	5.0	2	0.1	19	1.3
Upper-level employees	108	25.7	80	19.0	249	17.1	244	16.7
Lower-level employees	107	25.7	89	21.1	861	59.1	807	55.4
Manual workers	189	44.9	218	51.8	334	22.9	360	24.7
Other	13	3.1	13	3.1	11	0.8	27	1.8
Employment sector								
Private sector	345	82.0	309	73.4	754	51.8	909	48.4
Public sector	76	18.0	112	26.2	703	48.2	969	51.6
Gross income (€)								
≤30 000	123	29.2	147	34.9	770	52.8	844	57.9
30 001–60 000	254	60.3	233	55.3	642	44.1	563	38.6
≥60 001	44	10.5	41	9.7	45	3.1	50	3.4
Industrial sector								
Agriculture, forestry & fishing; mining & quarrying	4	1.0	12	2.9	5	0.3	14	1.0
Manufacturing	108	25.7	97	23.1	131	9.0	101	7.0
Electricity, gas, steam & air conditioning supply	3	0.7	2	0.5	6	0.4	5	0.3
Water supply; sewerage, waste management & remediation activities	9	2.1	3	0.7	1	0.1	3	0.2
Construction	24	5.7	47	11.2	12	0.8	8	0.6
Wholesale & retail trade; repair of motor vehicles & motorcycles	46	10.9	37	8.8	148	10.2	125	8.6
Transportation & storage	43	10.2	49	11.7	37	2.5	41	2.8
Accommodation & food service activities	5	1.2	18	1.2	51	3.5	65	4.5
Technical & scientific work etc.	96	23.0	80	19.0	418	28.7	283	19.5
Education	24	5.7	26	6.2	79	5.4	118	8.1
Human health & social work activities	34	8.1	31	7.4	509	34.9	594	40.9
Other	12	2.9	20	4.8	49	3.4	67	4.6
Missing	12	2.9	12	2.9	11	0.8	28	1.9
Employment (days) [a]								
181–365	4	1.0	4	1.0	11	0.8	15	1.0
366–730	417	99.0	417	99.0	1446	99.2	1442	99.0
Unemployment (days) [a]								
0	371	88.2	368	87.4	1355	93.0	1351	92.7
1 –30	9	2.1	9	2.1	25	1.7	23	1.6
31–180	27	6.4	34	8.1	63	4.3	61	4.2
181–730	14	3.3	10	2.3	14	1.0	22	1.5
Full sick leave (days) [b]								
0	243	57.8	241	57.2	703	48.2	756	51.9
1–30	103	24.4	114	27.1	409	28.1	386	26.5
31–90	59	14.0	55	13.1	281	19.3	241	16.5
91– 150	16	3.8	11	2.6	64	4.4	74	5.1

Continued

Table 1. Continued.

	Men (N=842)				Women (N=2 914)			
	Part-time sick leave (N=421)		Full-time sick leave (N=421)		Part-time sick leave (N=1457)		Full-time sick leave (N=1457)	
	N	%	N	%	N	%	N	%
Partial sick leave (days) [b]								
0	407	96.7	421	100.0	1385	95.3	1457	100.0
1–12	4	0.9	0		14	1.0	0	
13–24	8	1.9	0		38	2.6	0	
25– 36	2	0.5	0		16	1.1	0	
Immediately preceding full sickness absence (days)								
1–6	37	8.8	41	9.7	201	13.8	156	10.8
7–12	42	10.0	64	15.2	131	9.0	228	15.6
13– 18	42	10.0	58	13.2	159	10.9	193	13.2
19–24	42	10.0	71	16.9	160	11.0	329	13.1
25–30	58	13.7	42	10.0	153	10.5	189	13.0
31– 36	41	9.7	37	8.8	135	9.3	151	10.4
36–42	49	11.6	33	7.8	154	10.6	127	8.7
43–48	43	10.4	42	10.0	126	8.6	131	9.0
49– 59	67	15.9	33	7.8	238	16.3	113	7.8

[a] Number of days during the preceding two years; b Number of compensated days during the preceding two years.

individuals on the probability that they would belong to the partial sick leave group. We ran several matching models with different caliper values in order to have a maximum number of matched pairs. We set 0.2 as the maximum tolerance for matching. We succeeded in finding a matched control for all cases but one.

We calculated standardized mean differences and standardized proportion differences for the continuous and categorical baseline covariates, which were used in the propensity score models. The absolute standardized difference <10% indicates negligible imbalance (12). We also calculated overall and gender-specific balance ratio dividing the ratio of the sum of the absolute values of standardized difference for the nine baseline covariates in the initial (unmatched sample) by the corresponding sum in the propensity score matched sample. A balance ratio above one indicates reduction of imbalance.

We computed absolute and relative risk reduction (ARR and RRR) for sustained RTW and ARR for full and partial disability retirement in the matched sample (13). ARR refers to the difference (%) in the event rates between the assignment groups (part- and full-time sick leave), that is, the effectiveness of the treatment. RRR is a proportional measure (%) of efficacy referring to the extent to which the use of part-time sick leave decreases the risk of future events as compared with those who had had full-time sick leave. We performed subgroup analyses for groups of primary interest.

We also performed a set of sensitivity analyses to test whether remained imbalance in the baseline covariates after PS matching affected our main results. First, we repeated the analyses with adjustment for imbalanced covariates. Second, we selected fully matched groups regarding the covariate in question and repeated the analyses for the main outcome. The SAS 9.4 statistical software was used for the analyses (SAS Institute, Cary, NC, USA).

Results

In total, 1879 and 3969 persons with part- and full-time sick leave, respectively, were eligible for our study (appendix 1). After PS matching, there were 1878 persons with part-time sick leave and 1878 persons with full-time sick leave, 421 men and 1457 women in both groups. The PS matching reduced the total imbalance of baseline covariates with a ratio 1.86. The balance ratio was higher for men than women (2.14 versus 1.62, respectively). However, age (both genders), employment sector (men) and industrial sector (women) remained unbalanced after the matching (appendix 2, www.sjweh.fi/index.php?page=data-repository). Nevertheless, the part- and full-time sick leave groups were very similar as regards their demographic characteristics and SA history (table 1). The immediately preceding full SA spell was longer in the part- than full-time sick leave group among both men and women.

Overall, 77.5% of the study population showed sustained RTW during follow-up, with an absolute risk difference of 8.0% and relative risk difference of 10.9% in favor of the part-time sick leave group (table 2). A difference in favor of the part-time sick leave group was seen in both genders, all age groups – particularly in those aged 45–64 years – and for mental disorders, whereas there was no difference in those with musculoskeletal disease. The effect was larger in the private than public sector and

Table 2. Sustained return to work (RTW) in the part- and full-time sick leave group. [ARR=absolute risk reduction; RRR=relative risk reduction; CI=confidence interval.]

	Part-time sick leave (N=1878)		Full-time sick leave (N=1878)		P-value	ARR		RRR	
	N	%	N	%		% [a]	95% CI	% [a]	95% CI
All	1530	81.5	1380	73.5	<0.0001	-8.0	-10.7– -5.3	-10.9	-14.8– -7.1
Gender									
Men	350	83.1	314	74.6	0.002	-8.5	-14.0– -2.8	-11.5	-19.6– -3.6
Women	1180	81.0	1066	73.2	<0.0001	-7.8	-10.9– -4.7	-10.7	-15.2– -6.3
Age group (years)									
20–44	635	81.2	562	76.3	0.02	-4.9	-9.1– -0.7	-6.5	-12.3– -0.9
45–54	591	83.9	476	75.2	<0.0001	-8.8	-13.1– -4.3	-11.6	-17.9– -5.5
55–64	304	77.6	342	67.3	0.001	-10.2	-16.0– -4.1	-15.2	-24.8– -5.9
Diagnostic group									
Mental disorders	733	86.0	568	66.7	<0.0001	-19.4	-23.1– -15.4	-29.0	-35.6– -22.4
Musculoskeletal diseases	797	77.7	812	79.1	0.45	1.5	-2.2–5.1	1.9	-2.8– 6.3
Employment sector									
Private	890	81.0	646	71.1	<0.0001	-9.9	-13.7– -6.1	-14.0	-19.8– -8.3
Public	640	82.2	734	75.7	0.001	-6.4	-10.2– -2.4	-8.5	-13.8– -3.2
Industrial sector									
Manufacturing	189	79.1	128	64.6	0.001	-14.4	-22.9– -5.5	-22.3	-38.2– -8.0
Wholesale & retail trade; repair of motor vehicles & motorcycles	161	83.0	123	75.9	0.11	-7.1	-15.7– -1.8	-9.3	-22.1– -2.3
Technical & scientific work etc.	428	83.3	260	71.6	<0.0001	-11.6	-17.3– -5.8	-16.3	-25.4– -7.8
Human health & social work	438	80.7	482	77.1	0.15	-3.5	-8.3– 1.3	-4.7	-11.1– -1.7

[a] Negative values indicate an increase in risk and can be interpreted as an increase in the likelihood of sustained RTW due to allocation to part-time sick leave group.

– of the four largest industrial sectors – most conspicuous in manufacturing as well as in technical and scientific work (table 2). A similar analysis within the diagnostic group of mental disorders by gender showed largely similar differences between the age groups, sectors of employment and industrial sectors (data not shown).

Table 3. Overall work participation in the part- and full-time sick leave group during 2-year follow-up. [CI=confidence interval.]

	Part-time sick leave (%)		Full-time sick leave (%)	
	Mean	95% CI	Mean	95% CI
All	82.6	81.4–83.8	72.1	70.9–73.3
Gender				
Men	84.0	81.3–86.7	70.2	67.5–72.9
Women	82.3	80.9–83.7	72.6	71.2–74.0
Age group (years)				
20–44	85.1	83.3–86.9	76.5	74.5–78.5
45–54	84.0	82.0–86.0	72.9	70.7–75.1
55–64	75.0	71.9–78.1	64.8	62.1–67.5
Diagnostic group				
Mental disorders	84.1	82.1–86.1	69.1	67.1–71.1
Musculoskeletal diseases	81.3	79.7–82.9	74.6	73.0–76.2
Employment sector				
Private	84.0	82.4–85.6	71.0	69.2 -72.8
Public	80.8	78.8–82.8	73.0	71.2–74.8
Industrial sector				
Manufacturing	84.6	81.1 -88.1	67.6	63.9–71.3
Wholesale & retail trade; repair of motor vehicles & motorcycles	83.1	79.4–86.8	75.8	71.7–79.9
Technical & scientific work	84.9	82.6 -87.3	71.3	68.6–74.0
Human health & social work	80.2	77.9–82.6	75.4	73.2–77.6

Mean overall time spent at work was 77.4% and it was at a 10.5% higher absolute level in the part- compared to the full-time sick leave group during the 2-year follow-up (table 3). A significant difference was seen across the genders, age and diagnostic groups as well as employment and industrial sectors. The difference was larger among men than women and for mental disorders compared to musculoskeletal diseases. Within the diagnostic group of mental disorders, a difference was seen in all subgroups (appendix 3, www.sjweh.fi/index.php?page=data-repository). Within musculoskeletal diseases, a smaller, however, statistically significant difference was seen in both genders (10.5% for men, 5.7% for women), for the youngest age group in men and the second youngest in women, for the private sector, and for the public sector in women, for the manufacturing sector and for the technical and scientific work in women. Within musculoskeletal diseases, no difference was seen for the healthcare and social work sector among either men or women.

Of the entire population, 4.7% had full disability retirement during the follow-up time, the proportion of those in the full-time sick leave group being almost threefold (6.9 versus 2.4%) compared with that of the part-time sick leave group (table 4). The overall ARR for the part-time sick leave group was 4.5% (95% CI 3.1–5.6). It was similar in both genders, higher in the oldest age group compared with the younger age groups, slightly higher in mental disorders than musculoskeletal diseases, and remarkably high in technical and scientific work.

Table 4. Full and partial disability retirement and unemployment in the part- and full-time sick leave group. [CI=confidence interval.]

	Full disability retirement					Partial disability retirement					Unemployment			
	Part-time sick leave		Full-time sick leave		P-value	Part-time sick leave		Full-time sick leave		P-value	Part-time sick leave		Full-time sick leave	
	N	%	N	%		N	%	N	%		Mean	95% CI	Mean	95% CI
All	46	2.4	130	6.9	<0.0001	148	7.9	33	1.8	<0.0001	1.8	1.4–2.2	3.2	2.8–3.6
Gender														
Men	17	4.0	35	8.3	0.01	22	5.2	3	0.7	<0.0001	2.1	0.9–3.3	4.4	3.2–5.6
Women	29	2.0	95	6.5	<0.0001	126	8.6	30	2.1	<0.0001	1.6	1.0–2.2	2.8	2.2–3.4
Age group (years)														
20–44	0		4	0.5	0.06	4	0.5	0		0.12	2.7	1.9–3.5	4.3	3.3–5.3
45–54	13	1.8	28	4.4	0.007	58	8.2	12	1.9	<0.0001	1.1	0.5–1.7	2.6	2.0–3.2
55–64	33	8.4	98	19.3	<0.0001	86	21.9	21	4.1	<0.0001	1.1	0.1–2.1	2.2	1.4 -3.0
Diagnostic group														
Mental disorders	15	1.8	63	7.4	<0.0001	37	4.3	11	1.3	<0.0001	2.1	1.3–2.9	3.5	2.7–4.3
Musculoskeletal diseases	31	3.0	67	6.5	<0.0001	111	10.8	22	2.1	<0.0001	1.5	0.9–2.1	2.8	2.2–3.4
Employment sector														
Private	21	1.9	56	6.2	<0.0001	41	3.7	8	0.9	<0.0001	2.3	1.7–2.9	4.1	3.3–4.9
Public	25	3.2	74	7.6	<0.0001	107	13.7	25	2.6	<0.0001	1.1	0.5–1.7	2.2	1.6 -2.8
Industrial sector														
Manufacturing	6	2.5	14	7.1	0.04	9	3.8	2	1.0	0.12	2.5	0.9–4.1	5.4	3.6–7.2
Wholesale & retail trade; repair of motor vehicles & motorcycles	5	2.6	6	3.7	0.56	4	2.1	0		0.13	2.4	0.8–4.0	3.4	1.6–5.2
Technical & scientific work	6	1.2	28	7.7	<0.0001	26	5.1	7	1.9	0.02	1.5	0.7–2.3	2.8	1.8–3.8
Human health & social work	15	2.8	40	6.4	0.003	80	14.7	20	3.2	<0.0001	0.8	0.2–1.4	1.7	1.1–2.3

A total of 4.8% had partial disability retirement during the follow-up, the proportion of those in the part-time sick leave group being about 4.5-fold (7.9 versus 1.8%) compared with those in the full-time sick leave group (table 4). The overall absolute risk difference was -6.1% (95% CI -7.1– -4.9) (negative value indicating increase in risk). It was a little higher among women compared with men and remarkably high in the oldest age group, in the public sector and healthcare and social work. It was also clearly higher in musculoskeletal diseases compared with mental disorders.

A small proportion of time (2.5%) was spent unemployed during the follow-up. This proportion was about 1.8-fold (3.2 versus 1.8%) in the full- compared with the part-time sick leave group (table 4). The difference in favor of the part-time sick leave group was larger among men than women and in manufacturing compared to other industries. The difference was seen in both mental disorders and musculoskeletal diseases.

Figure 2 shows the proportion of time spent in seven work participation statuses. In the part-time SA group, work participation increased rapidly to about 85% and remained throughout the follow-up time at about 10% higher level than in the full-time sick leave group. The status of partial work disability (including both part-time sick leave and partial disability retirement) reduced in the part-time sick leave group after about four months and then increased again (reflecting first use of part-time sick leave and later transition to partial disability retirement), while the proportion of partial work disability remained at a low level in the full-time sick leave group throughout the follow-up time. The proportion of time in full disability retirement increased rapidly during the first 2–3 months in the full-time sick leave group, while an increase in the part-time sick leave group was smaller and occurred later and gradually. Similarly, unemployment was rarer in the part- compared to full-time sick leave group during the first year of follow-up, while, during the second follow-up year, the group differences disappeared. In the part-time sick leave group, full-time SA increased in the beginning and then reduced towards the follow-up, whereas in the full-time sick leave group full-time SA reduced rapidly and stayed at a low level.

The sensitivity analyses showed that the main results remained even after controlling for the residual imbalance of the baseline covariates (appendices 4 and 5, www.sjweh.fi/index.php?page=data-repository).

Discussion

This quasi-experimental study on the effectiveness of the use of part-time SA at an early stage of work disability showed positive effects on sustained RTW and overall work participation. The effect on work participa-

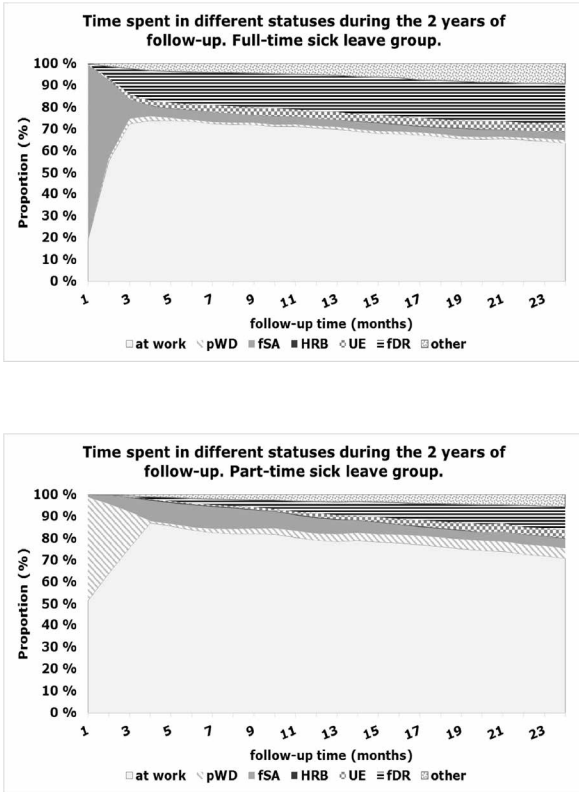

Figure 2. Time spent in different work participation statuses during the 2-year follow-up. [pWD=partial work disability (including part-time sick leave and partial disability retirement), fSA=full-time sickness absence, HRB=health-related benefits (including full and partial rehabilitation subsidy and allowance, when employed), UE=unemployment, fDR=full disability retirement, other (outside the labor force, status not known).]

tion was seen throughout the 2-year follow-up period. The positive effects were in general more pronounced for mental disorders than musculoskeletal diseases. Part-time sick leave reduced the risk of full disability retirement and increased the risk of partial disability retirement. Also unemployment was rarer after part- compared to full-time sick leave.

The results are in agreement with previous studies on part-time sick leave from Sweden (3, 5) and other Nordic countries (1, 2). They are also in agreement with positive results from studies on RTW with gradually increasing work hours and tasks in combination with a workplace intervention (14) or after rehabilitation (15, 16). We have earlier assessed the effectiveness of the use of part-time sick leave at a later stage (after about 12 weeks) of work disability in Finland and saw a smaller increase of 5.3% in work participation compared with 10.5% in the current study (4). It seems that the effect of the use of part-time sick leave on work participation is larger at an earlier than later stage of work disability. Our earlier results showed a larger decrease in full disability retirement and also larger increase in partial disability retirement than was seen in the current study. It is understandable that the effects on disability retirement are larger at later stages of work disability; however, it is of importance that even early part-time sick leave reduced the incidence of full disability retirement. Although the increase in the risk of partial disability retirement was very high in the part-time sick leave group, the fact that the majority of those on partial disability retirement are at work suggests that the use of part-time sick leave increased work retention. Part-time sick leave and the ensuing partial disability retirement seem to be the means to prolong the work career especially for the oldest persons.

Within the two diagnostic groups of our interest, work participation was higher in the part- compared to full-time sick leave group in general across the genders, age groups, and industries, with the exception of persons with musculoskeletal diseases in the healthcare and social work where no effect on work participation was seen. While transition to full disability retirement was not affected in this group by the use of part-time sick leave, transitions to partial disability retirement were conspicuously frequent. It seems that working part-time with the support of partial disability retirement benefit is one possibility for those with musculoskeletal diseases to continue working in this industry. In the group of mental disorders, transitions to full disability retirement reduced and work participation increased even in healthcare and social work.

An important result of this study is that part-time sick leave showed major effects on sustained RTW and overall work participation especially among those with mental disorders. To receive partial sickness benefit during part-time sick leave, a written agreement is required from the employer that part-time work can be provided, indicating some stability of the work contract. Part-time sick leave should therefore be considered as an alternative for full-time sick leave for persons with mental disorders having a longer term work contract and whose symptoms prevent them from performing regular work duties. Persons with mental disorders may have difficulty to be re-employed if they lose their job during or shortly after SA.

The strengths of this study are a representative sample of working age Finns with detailed information about SA including diagnosis and other health-related benefits, employment periods with industrial trades as well as unemployment. The persons who had been on full-time sick leave were matched with those having had part-time sick leave within gender and diagnostic groups using several demographic variables and length of previous SA. This made the groups well comparable to study the effectiveness of part-time sick leave on the

outcomes of interest. As it is not possible to carry out a randomized controlled trial with a legislative measure, such as prescription of full- or part-time sick leave, the propensity score matching was a feasible method to approach a randomized controlled trial. It also provided a possibility to have a concurrent comparison group.

A possible weakness could be that persons who had had part-time sick leave may have been selected according to factors about which we did not have information, leading to a bias in our results. For instance, persons' motivations with regard to working may affect their return to work (17). A bias could also have arisen if those on full-time sick leave had a more severe disease or more co-morbid conditions, for example diabetes, than those on part-time sick leave. Of the variables on which we had information, the small differences that were seen showed that those who had had part-time sick leave had more SA days during the two preceding years and also a longer immediately preceding full SA compared with those who had had full-time SA. This suggests rather a heavier ill-health burden among persons in the part- compared to full-time sick leave group, indicating that the results of this study may have rather under- than overestimated the effects of part-time sick leave. A further source of potential bias could arise from different physical work load or psychosocial work environment among those with part-time and full-time sick leave. While we were not able to control for these factors directly, we did include employment sector and industrial sector in propensity score matching, and adjusted for their imbalance in additional sensitivity analyses.

In conclusion, the use of part-time sick leave during the first three months of SA enhances RTW in mental disorders and overall work participation during two years among individuals with mental disorders or musculoskeletal diseases. It also reduces the risk of full disability retirement and being unemployed; however, it carries an increased risk of partial disability retirement, especially in the social work and healthcare sector. The major effects on work participation in mental disorders warrant recommendation of this benefit for persons with mental problems who are unable to continue their work with full activities. Although part-time sick leave involves a risk of partial disability retirement especially among persons with musculoskeletal diseases, it contributes to a higher work retention even in this diagnostic group.

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