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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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Part-time sick leave is used in many countries to enhance return to work, however its effectiveness – especially at the early stage of work disability – is not known. This quasi-experiment utilizing propensity score matching shows that part-time sick leave, started during the first 12 weeks of work disability, enhances return to work and increases work participation over a 2-year period.

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**Key terms:** early part-time sick leave; Finland; legislation; natural experiment; part-time sick leave; partial sick leave; propensity score; quasi-experiment; rehabilitation; return to work; RTW; sick leave; sickness absence; work participation

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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...
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.]](image-url)
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) |                           | Men (N=1457) | Women (N=1457) |
|---------------------------|-------------|----------------|---------------------------|-------------|----------------|
|                           | Part-time sick leave | Full-time sick leave |                           | Part-time sick leave | Full-time sick leave |
|                           | (N=421)     | (N=421)        |                           | (N=1457)     | (N=1457)        |
| 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       |

| Diagnostic category       | N %       | N %       |                           | N %       | N %       |
|---------------------------|----------|----------|---------------------------|----------|----------|
| 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  |          |          |                           |          |          |
| ≤30 001–60 000            | 123 29.2  | 147 34.9  |                           | 770 52.8  | 844 57.9  |
| ≥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       | 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 | 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
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
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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, no difference was seen for the healthcare and social work sector among either men or women.

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       | %   | %   | %   | 95% CI | %   | %   | 95% CI |
| All                           | 1530                          | 1380    | 73.5| <0.0001 | -8.0| -10.7− | -5.3| -10.9| -14.8− | -7.1 |
| Gender                        |                               |         |     |         |     |         |     |       |       |      |
| Men                           | 350                           | 314     | 74.6| 0.002   | -8.5| -14.0− | -2.8| -11.5| -19.6− | -3.6 |
| Women                         | 1180                          | 1066    | 73.2| <0.0001 | -7.8| -10.9− | -4.7| -10.7| -15.2− | -6.3 |
| Age group (years)             |                               |         |     |         |     |         |     |       |       |      |
| 20–44                         | 635                           | 562     | 76.3| 0.02    | -4.9| -9.1−  | -0.7| -6.5 | -12.3− | -0.9 |
| 45–54                         | 591                           | 476     | 75.2| <0.0001 | -8.8| -13.1− | -4.3| -11.6| -17.9− | -5.5 |
| 55–64                         | 304                           | 342     | 67.3| 0.001   | -10.2| -16.0− | -4.1| -15.2| -24.8− | -5.9 |
| Diagnostic group              |                               |         |     |         |     |         |     |       |       |      |
| Mental disorders              | 733                           | 568     | 66.7| <0.0001 | -19.4| -23.1− | -15.4| -29.0| -35.6− | -22.4 |
| Musculoskeletal diseases      | 797                           | 812     | 79.1| 0.45    | 1.5 | -2.2−  | 1.9 | -2.8 | -6.3   |      |
| Employment sector             |                               |         |     |         |     |         |     |       |       |      |
| Private                       | 890                           | 646     | 71.1| <0.0001 | -9.9| -13.7− | -6.1| -14.0| -19.8− | -8.3 |
| Public                        | 640                           | 734     | 75.7| 0.001   | -6.4| -10.2− | -2.4| -8.5 | -13.8− | -3.2 |
| Industrial sector             |                               |         |     |         |     |         |     |       |       |      |
| Manufacturing                 | 189                           | 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 | 123 | 75.9 | 0.11 | -7.1 | -15.7− | -1.8 | -9.3 | -22.1− | -2.3 |
| Technical & scientific work etc. | 428 | 260 | 71.6 | <0.0001 | -11.6| -17.3− | -5.8| -16.3| -25.4− | -7.8 |
| Human health & social work    | 438                           | 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                     | 82.6                     | 81.4–83.8 | Mean | 72.1 | 70.9–73.3 |

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.
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 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.

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-
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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 disabili-

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)].

ity. 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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