This is a post-peer-review, pre-copyedit version of an article published in Journal of Occupational Rehabilitation. The final authenticated version is available online at: http://dx.doi.org/10.1007/s10926-019-09869-8

Individual- and company-level predictors of receiving vocational rehabilitation: a multilevel study of Finnish private sector workplaces

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Abstract

Purpose: The aim of this study was to examine the magnitude of company-level variation in vocational rehabilitation (VR) and to determine which individual- and company-level characteristics are associated with receiving VR due to mental disorders, musculoskeletal diseases, and other somatic diseases.

Methods: A 30% random sample of all Finnish private sector companies with more than 10 employees aged 25-62 years at the end of 2010 (5,567 companies with 300,601 employees) was followed up for the receipt of VR over the next six years. Company size and industry, as well as gender, age, education, social class and sickness absence measured both at the individual- and company-level were used as explanatory variables in multilevel logit models.

Results: After controlling for the individual-level characteristics, 12% of the variance in VR was attributed to the company level. The proportion was largest in VR due to musculoskeletal diseases. Receiving VR was more common among women, older employees (except the oldest age group), those with low education (particularly due to musculoskeletal diseases), low social class, and previous sickness absence. Receiving VR was more common in larger companies, and in construction and in health and social work, and less common in professional, scientific and technical activities. Furthermore, receiving VR was more common in companies with low proportion of highly educated employees and with higher sickness absence rates.

Conclusions: Company-level variation in receiving VR was substantial. Adopting the practices of the companies with highest participation in VR could help to avoid work disability problems.

Keywords: Rehabilitation, Vocational; Disability; Company; Workplace; Risk Factors

Introduction

Increasing labor force participation has become a key policy issue in the western countries. To ease the burden of population aging on social security and health care, people are expected to continue working in older ages than before [1, 2]. However, health problems and reduced work capacity may prevent retaining workers in the labour force. Vocational rehabilitation (VR) is considered an important means to enable people to continue working despite health problems, and it is also the preferred alternative by many of the employees facing limitations in their work ability. In Finland, the number of participants to VR has more than doubled in the last 10 years [3, 4].

VR refers to a wide range of work-related activities that aim at maintaining people in employment when their work ability is threatened by illness or injury [5, 6]. In Finland, pension insurers are the primary organizers of VR for people who are attached to employment [3]. Most commonly such VR consist of work try-outs in the employee's previous job with a reduced work load or training of new tasks, but it can also consist of learning a new occupation or support for starting entrepreneurial activities. The initiative to VR may come from the employee, occupational health care or the employer. Eligibility to VR requires that one has an illness or injury that threatens one's work ability. Furthermore, it also requires confidence from the pension insurer that VR can prevent or postpone disability retirement. The employee's commitment to the process is essential when VR is put into practice. Thus, becoming a recipient of VR is a multiphase process that concerns various parties, including the employee and the employer.

Possible variation in the participation in VR between companies may relate to individual-level characteristics of the employees or to contextual differences between the companies. Individual-level characteristics of the employees, such as age or educational level, may affect their health and work-ability, and the effects of health problems may vary depending on work tasks [7, 8]. Employees may also have different motivation to participate in VR [9, 10]. However, it is unclear to what extent individual-level attributes of the employees can explain differences in the participation in VR between companies. In addition to compositional differences due to characteristics of the employees, variation in the nature of work, work environments and working conditions produce contextual differences between companies operating for example in different industries or having different professional requirements. Furthermore, even companies operating in the same field may have organizational and cultural differences in the practices concerning prevention and management of workplace disability. The companies may thus differ in how they support their employees' work ability and what kind of actions they take when the employees experience health problems and confront the risk of disability [11].

However, although the significance of VR is widely recognised, previous research on the determinants of receiving VR is relatively scarce. A review of Swedish studies found that participation in VR was more common among men, younger people, those with longer-term sick leave, those with lower income, and those not unemployed. People diagnosed with musculoskeletal diseases, mental disorders, or alcohol abuse more often participated in VR than people with other diagnoses [12]. A study among Finnish public sector employees found that participants in VR more often were women, manual employees, had a permanent employment contract and had history of sick leave [13]. The study examined later rehabilitation targeted to those who already suffer from work ability problems, but the outcome did not include VR by the pension insurers. Another study based on the

same cohort showed that participation in VR was predicted by older age, poor self-rated health, and low educational level [14].

We are not aware of any studies that have examined company-level determinants of VR. However, there are studies that more generally have examined whether characteristics of the companies are associated with work accommodation and retention policies that aim at extension of working careers. A Dutch study found that larger company size was associated with the provision of employability-enhancing practices. However, share of older workers and average educational level of the company were not associated with such practices, and differences between industries were small [15]. Another Dutch study found that company size was related to willingness to provide training to increase the employees' employability, but industrial sector or educational structure were not [16]. A Norwegian study found that larger companies more often had policies to prevent exclusion of older employees but differences between industries were inconsistent [17].

The current study was set out to examine individual- and company-level determinants of VR in Finland. The specific research questions were:

1) What is the extent of company-level variation in VR, and how does this vary by diagnostic causes of rehabilitation?

2) Which individual- and company-level characteristics predict the receipt of VR in different diagnostic groups?

Methods

Data

The data were based on a 30% random sample of all private sector companies in Finland at the end of 2010. The sample was drawn from the database of companies' earnings-related pension contributions [18] and combined with data on employees aged 25-62 years in the respective companies using insurance numbers. To calculate aggregated company-level characteristics we omitted companies with less than 10 employees. We also excluded employees who had received VR or had been on temporary disability pension during the preceding two years. The final data included 300,601 employees in 5,567 companies.

Measurements

Vocational rehabilitation

We used the pension register of the Finnish Centre for Pensions to derive all new cases of VR in the combined company-employee sample until the end of 2016. The register includes information on VR paid by pension insurance companies. In Finland, all private sector employees are insured in pension insurance companies whose sole purpose is to manage statutory pension insurance against the risk of old age, disability, or death of the family breadwinner. These pension insurance companies also have the primary responsibility for organising VR to those who are attached to employment. To be eligible for VR provided by the pension insurers one must have had a sufficient amount of recent employment (sum of earnings in the previous five years approximately 35,000 euros at 2019 level). Participants can be currently employed or persons seeking return to work after illness.

A precondition for VR is that there is a threat of work disability due to a medically diagnosed illness or impairment that is likely to lead to disability pension in the next few (five or so) years. It is also based on the expectation that disability retirement can be prevented or postponed with VR. VR by the pension insurers is always personal, group-based rehabilitation courses are not covered. VR can consist of work try-outs (aiming at return to the employee's old job with somewhat modified work tasks) or job coaching (on-the-job learning of a new occupation that allows one to work despite the illness). In addition, VR can comprise education and schooling, ranging from short courses to several years of vocational studies. Pension insurers do not organize medical rehabilitation, such as physiotherapy or neuropsychological rehabilitation. Those who are not eligible to VR provided by the pension insurers may receive VR from the Social Insurance Institution or the employment authorities. VR by the other organisers or medical rehabilitation was not included in our data.

Participation in VR was measured by the receipt of rehabilitation allowance or rehabilitation increment. Rehabilitation allowance is paid to compensate for lost income during active rehabilitation and rehabilitation increment is a similar benefit for those who were granted VR to support return to work from a temporary disability pension. Having a temporary disability pension always requires a plan for medical treatment or rehabilitation. The primary medical diagnosis of VR was classified into mental disorders (ICD-10 chapter F), musculoskeletal diseases (chapter M), other somatic diseases (other ICD-10 codes).

Individual- and company-level determinants of vocational rehabilitation

The individual-level determinants of VR were gender, age, educational level and occupational class and whether or not the employee had received sickness allowance in 2010.

Age was categorized as 25–34, 35–44, 45–54 and 55–62 years. Information on educational level and occupational class were derived from Statistics Finland. Educational level was classified into primary education or no qualifications, secondary, lower tertiary (corresponding to post-secondary vocational education or a bachelor's degree) and higher tertiary education (corresponding to a master's degree or higher). Social class was classified into manual workers, lower non-manual employees (clerical and administrative occupations such as office clerks and laboratory assistants), and upper non-manual employees (professional and managerial occupations such as dentists or lawyers), and others/unknown. Information on sickness allowance was derived from a register that includes information on sickness compensation paid to the employee. In Finland, sickness allowance may be received after a mandatory waiting period of 10 working days. However, depending on the collective labour agreement, the employer may continue to pay the salary also after the waiting period up to three months, in which case the allowance is paid to the employer [19]. About a third of sickness allowance periods are therefore missing from these data.

Company-level characteristics were company size and industry. Company size was classified into quintiles according to the number of employees at the company. Industry was classified into 11 groups by combining closely related industries of the Standard Industrial Classification of Statistics Finland.

In addition, aggregated company-level characteristics were created from the five individual-level characteristics. These variables depict gender structure (proportion of women), age structure (proportion of >50 year old employees), educational structure (proportion of employees with tertiary education), socioeconomic structure (proportion of manual employees), and morbidity (proportion of employees receiving sickness allowance during

2010) of the companies. All these aggregated company-level variables were divided into quintiles consisting of about 60,000 employees each. Gender structure and age structure were not associated with participation in VR, and therefore the results for these characteristics are not presented in the Tables.

Statistical methods

The data were analysed using two-level logistic regression models with employees nested in companies. The follow-up time from the first of January 2011 until the beginning of VR was recorded. The employees were censored in the event of the employees 63th birthday, old-age pension, death or the end of follow-up in 31st of December 2016. The log of follow-up time was included as the offset to take into account the decreasing number of employees over time particularly in the oldest age group.

Variance components (random effects) were used to calculate the magnitude of between-company variation in VR. This is expressed as the proportion of the company-level variance of the total variance, starting from the empty model that only included the random group indicator for the company [20]. Individual- and company-level characteristics were then added to see how much they explained of the between-company variation. Associations of the individual- and company-level characteristics with receiving VR are reported as fixed effects. They are presented as odds ratios (OR) with 95% confidence intervals (CI) from the model where all individual- and company-level characteristics have been mutually controlled for. The analyses were conducted for any VR and separately for the three diagnostic groups using the xtlogit-routine in Stata 14.

Results

During the six-year follow-up, 4,721 (1.57 percent) of the employees received VR. In more than half of the cases VR was based on musculoskeletal diagnosis (n=2,557). One fourth of VR was granted due to other somatic diseases (n=1,326) and less than one fifth due to mental disorders (n=838).

Sixty percent of the employees in the study cohort were men (Table 1). The study population included more younger than older employees. Fourteen percent of the employees had only primary education and nearly half a secondary education, and forty percent were manual workers. Four percent had received sickness allowance in 2010. Manufacturing was clearly the most common industry, followed by trade. The other company-level characteristics were divided into quintiles (the range of each category is given in parentheses). Table 1 also shows the proportion of rehabilitees over the six-year follow-up by the individual- and company-level variables. As the associations of these variables with the receipt of VR are shown in Tables 3 and 4 (controlling for the other characteristics) closer inspection of these descriptive rates is left to the reader.

The magnitude of company-level variation in receiving VR was evaluated as the proportion of the company-level variance of the total variance (Table 2). Considering any VR, 17.2 percent of the variance could be attributed to the company level. Controlling for the individual-level characteristics of the employees reduced this figure by 30 percent, and further controlling for the company-level characteristics had some additional effect, after which 9.5 percent of the variance remained at the company level. Company-level variation was larger in VR received due to musculoskeletal diseases than other somatic dis-

eases or mental disorders. Controlling for the individual- and company-level characteristics explained nearly half of the company-level variance. However, statistically significant variation between the companies remained after all these characteristics were controlled for.

Table 3 shows the associations of the individual-level characteristics with receiving VR. Also the company-level characteristics have been controlled for in this table. Women were more likely to have received VR than men. The gender difference was particularly large for VR due to mental disorders but existed also for VR due to musculoskeletal diseases. Receiving VR increased by age but fell among the 55-62 year-olds. The proportion of rehabilitees was clearly higher among those with lower education, in particular concerning VR due to musculoskeletal diseases. Receiving VR also became more common by lowering social class, but social class was not associated with VR due to mental disorders. Having sickness absence in 2010 was strongly associated with the receipt of VR during the next 6 years in all diagnostic groups.

Associations of the company-level characteristics with the receipt of VR are presented in Table 4. Receiving VR increased strongly by company size. The association was fairly similar in all diagnostic groups. Receiving VR was more common than average in construction and especially in health and social work industries, and less common in professional, scientific and technical activities. However, there were large differences between the diagnostic groups. In health and social work, participation in VR was more common than average in all diagnostic groups. Furthermore, receiving VR due to mental disorders was more common than average in information and communication industries, and VR due to musculoskeletal diseases was more common than average in construction. Due to

other diseases, receiving VR was more frequent in transportation and storage and accommodation and food services and less frequent in professional, scientific and technical activities, compared to all industries on average. Receiving VR became less common with increasing proportion of highly educated employees in the company, which was due to VR received due to musculoskeletal diseases. Receiving VR also was less common in companies with larger proportion of manual workers and slightly more common in companies with the highest sickness absence rates.

Discussion

Better knowledge on individual- and company-level determinants of receiving VR could improve its efficiency and advice in the development of new services. This study therefore examined the extent of company-level variation in receiving VR and its individual- and company-level determinants. Substantial variation in receiving VR between companies was found. All studied individual-level determinants predicted participation in VR. Of the company-level determinants, receiving VR was predicted by larger company size, and VR was more common in construction and in health and social work, and less common in professional, scientific and technical activities. Furthermore, receiving VR was more common in companies with low proportion of highly educated employees and with higher sickness absence rates.

Company-level variation in vocational rehabilitation

Of the total variation in participation in VR, 17 percent could be attributed to the company level. After accounting for the five measured individual-level characteristics, this proportion reduced to 12 percent. Such a company-level variation in VR is larger than what has been previously found in questionnaire-based work ability or register-based disability retirement: In a Swedish study of 90 workplaces, 2.9 percent of differences in self-rated work ability could be attributed to workplace level, which was roughly the same magnitude as in other health indicators [21]. In a Finnish study, 9.8 percent of the risk in disability retirement could be attributed to the company level, before controlling for any individual- or company-level characteristics [22]. Larger variation in VR than in disability retirement is expected, as companies may have better possibilities to react to the threat

of losing one's work ability than actual loss of work ability. Furthermore, VR typically takes place at the workplace and therefore workplace involvement is an essential part of the rehabilitation process. The extent of company-level variation in VR was about equally large than what has been observed for the risk of partial disability pension [22]. Because partial disability retirees typically continue working with reduced working hours, the employer's role in making the necessary arrangements is large. Hence, partial disability pension has many similarities with VR.

The extent of company-level variation was largest in VR due to musculoskeletal diseases. This is important as more than half of VR is granted on the basis of musculoskeletal disorders, and the share of musculoskeletal diagnoses is higher among recipients of VR than among disability retirees [3]. Frequent use of VR due to musculoskeletal diseases may relate to the fact that musculoskeletal diseases more often than other illnesses are work-related and conventional methods of VR such as work modifications may be more feasibly used in these diseases than other somatic reasons or mental disorders [3].

Individual-level determinants of vocational rehabilitation

Women had more often VR than men due to mental disorders and musculoskeletal diseases, but there was no gender difference in VR due to other somatic diseases. Women have been shown to have a higher prevalence of pain and musculoskeletal and psychiatric symptoms than men [23, 24]. Women also have slightly higher incidence of disability retirement due to mental disorders and musculoskeletal diseases, whereas men have higher incidence of disability retirement due to other somatic diseases [25]. The gender gap was particularly pronounced in VR due to mental disorders. Depression and anxiety are more

common reasons for work disability among women, and they may be easier targets for VR than more serious mental disorders (such as schizophrenia or substance use disorders) that are more prevalent among men [26]. In addition to health problems, these gender differences may reflect a lower threshold for seeking medical help and better motivation for rehabilitation among women [10]. Also previous studies have usually shown higher rehabilitation rates among women [14, 27].

Participation in VR increased with increasing age but fell in the oldest age group. The increase by age is likely to reflect increasing need for rehabilitation among the middle-aged and older employees due to increased morbidity [28].The decrease in the oldest age group may result from considerations by the pension insurer that rehabilitation is not feasible when the remaining working years are few. Older employees may also themselves be less motivated to VR [10] and more inclined to prefer retirement over employment in the presence of health problems [29].

Lower educational level and social class were also strongly associated with receiving VR, apart from social class, that was not associated with VR due to mental disorders. Also these results are likely to mainly reflect higher need of rehabilitation due to more prevalent health problems in the lower socioeconomic groups. Having received sickness allowance in the year preceding the beginning of the follow-up was controlled for as a measure of morbidity, but this variable is not likely to capture all health differentials that exist at the baseline or emerge during the follow-up. Disability retirement has been shown to be strongly associated with lower socioeconomic position. In disability retirement due to musculoskeletal diseases socioeconomic differences are particularly large [30, 31]. Fur-

thermore, a study focusing on motivational background of rehabilitees showed that people with better education and higher household income were more motivated to participate in VR [10].

Sickness allowance paid during the employee's sickness absence period was used as a measure of morbidity. In occupational health care sickness absence can be used as a marker of emerging work ability problems, and frequent or long-term sickness absence can launch the rehabilitation process [32, 33]. As could therefore be expected, having received sickness allowance was strongly associated with participation in VR.

Company-level determinants of vocational rehabilitation

Larger workplace size was strongly associated with participation in VR. This finding agrees with previous results on retention policies [15-17], and is in line with expectations, as larger companies have better opportunities to reorganize their employees' duties or relocate them into jobs that match their weakened work ability. Large companies may also have better resources, more advanced RTW-practices and larger HR-personnel to manage rehabilitation. Furthermore, in Finland large companies are partly responsible for the disability pension costs of their employees, and the liability becomes higher with increasing company size, which encourages larger companies to find ways to maintain their employees in working life. A questionnaire study found that larger companies more often thought that this system encourages them to take care of their employees' work ability, for example through VR [34]. However, econometric studies have not found a marked effect in disability pension inflows in companies that are close to the threshold where the pension cost increase [35].

After controlling for the individual-level characteristics of the employees and the other company-level characteristics, differences between industries in the receipt of VR were relatively small. Only those working in health and social work industry clearly more often received VR, and this finding was consistent in all diagnostic groups. In addition, in construction industry receiving VR was slightly more common than average and in professional, scientific and technical activities somewhat less common than average. The frequent receipt of VR in health and social work is likely to reflect weakened work ability and increased need for rehabilitation. An earlier study has shown that also the risk of disability retirement was clearly elevated in health and social work industries [22]. In addition, as the receipt of VR was elevated in health and social work industries in all diagnostic groups, this may suggest that also familiarity of VR in health and social work may increase its use.

Receiving VR became less common with increasing proportion of highly educated employees in the company, which was largely due to VR based on musculoskeletal diseases. This is likely to relate to work tasks that may be more easily accommodated in companies with lower educational requirements. After controlling for the individual-level characteristics of the employees and the other company-level characteristics, receiving VR was also less common in companies with a larger proportion of manual workers. This adjusted association is opposite compared to the original association (see Table 1). This finding is hard to interpret, as supplementary analyses showed that the association was not reversed by the adjustment of any single covariate, but it was affected in part by the individual-level characteristics and in part by the company-level characteristics.

Companies with the largest sickness absence rates had highest participation in VR. This association was statistically significant for VR due to musculoskeletal diseases and VR due to other somatic diseases. Higher sickness absence rates and threats to work ability may relate to hazardous working conditions in the company [36, 37]. It therefore seems that workplaces with more morbidity respond to the situation by increasing VR. Long-term sickness absence seems a valid indicator for work-ability risks at the workplace [38, 39]. It may also be that in workplaces with high sickness absence rates VR is better known as alternative to get the employees with work ability problems back to work.

Methodological considerations

The study was based on a large and representative sample of Finnish companies and their employees. Our outcome measure included only VR provided by the earnings-related pension scheme. Even though everyone in the baseline cohort was working in the beginning of the follow-up, it may be that work histories for some of the employees are so short that they don't qualify for VR by the pension insurers. However, as the access criteria are fairly liberal, the number of such employees will be small.

During the study period, there was no significant changes in the sociodemographic determinants included in the study. However, the proportion of persons receiving sickness allowance somewhat decreased [40]. The extent of sickness allowance receipt might have some effect on how it is associated with VR. The volume of VR also increased during the study period, continuing a long-term trend [3]. When VR becomes more common, it may

focus on different groups than before. While the study is representative of the private sector employees in Finland in the 2010s, studies from other time periods and other countries are needed to replicate these findings.

The study did not include information on the contents of VR.. If VR consists of training into a new occupation, the role of the previous employer is likely to remain smaller than in workplace rehabilitation, which is most common type of VR [3]. During the follow-up people may have changed to other employer, which is likely to lead to underestimation of the found associations, especially concerning the company-level characteristics.

Data on sickness allowance were used to measure morbidity at the individual- and the company level. However, the register available did not include information on short-term absence nor sickness allowance that is directed to the employer in case the employer continues to pay a full salary during the employee's sickness. This is likely to underestimate the association between sickness allowance and VR especially at the individual level. Furthermore, the collective agreements defining sick pay are specific to economic sectors and they are thus often shared by the whole company (although the regulations may depend for example on the years of service and the level of education), which in turn could lead to some overestimation of the association of company-level sickness absence rates and VR.

Conclusions

Company-level variation in VR was substantial and larger than what has been previously found for disability retirement. Part of the company-level variation could be explained by

the individual- and company-level characteristics. The remaining differences in the participation in VR may partly reflect cultural differences and familiarity of VR between the companies. More widespread adoption of the practices in companies with highest participation in VR could help to avoid work disability problems.

Several company-level characteristics were associated with the receipt of VR over and above the individual-level characteristics of the employees, and these associations typically were strongest for VR due to musculoskeletal disorders. For example, the receipt of VR was elevated in large companies, health and social work industry and it became gradually rarer with the increasing proportion of highly educated employees. More evidence is needed on working conditions and other modifiable company-level risk factors that contribute such differences.

Conflict of interest

The authors declare that they have no conflicts of interest.

Ethical standard

The dataset consists of register data which were anonymized and not possible to trace back to individuals or companies. The Finnish Centre for Pensions obeys the ethical standards of The Finnish Advisory Board on Research Integrity and monitors that responsible scientific practice is followed in collecting, analysing and reporting of data.

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Table 1. Distributions of the individual- and company-level characteristics and the proportion of rehabilitees (%) by these characteristics over the six-year follow-up, broken down into those with a primary diagnosis on mental disorders (MD), musculoskeletal diseases (MSD) and other diagnoses.

		% rehabilitees over the follow-up 2011-2016			
	Distribution (%)	All	MD	MSD	Other
Individual-level characteristics					
Gender					
Men	60	1.41	0.18	0.78	0.44
Women	40	1.81	0.43	0.95	0.44
Age					
25-34	32	1.05	0.27	0.48	0.29
35-44	28	1.76	0.34	0.95	0.46
45-54	27	2.35	0.32	1.35	0.68
55-62	14	0.90	0.10	0.52	0.29
Level of education					
Higher tertiary	11	0.34	0.19	0.05	0.10
Lower tertiary	28	0.80	0.26	0.31	0.23
Secondary	47	2.08	0.32	1.17	0.59
Primary	14	2.35	0.27	1.47	0.62
Social class					
Higher non-manual employees	21	0.39	0.20	0.09	0.11
Lower non-manual employees	38	1.37	0.37	0.65	0.35
Manual workers	38	2.42	0.24	1.47	0.71
Other/unknown	4	1.50	0.16	0.87	0.48
Sickness absence in 2010					
No	96	1.26	0.23	0.66	0.37
Yes	4	8.73	1.44	5.19	2.11
Company-level characteristics					
Company size (quintiles)					
Lowest	20 (10-29)	1.17	0.21	0.61	0.34
2nd	20 (30-95)	1.21	0.24	0.60	0.38
3rd	20 (96-313)	1.43	0.25	0.76	0.42
4th	20 (315-1232)	1.59	0.30	0.84	0.45
Highest	20 (1241-5799)	2.47	0.40	1.45	0.62
Industry					
Manufacturing	31	1.53	0.20	0.88	0.45
Construction	7	2.21	0.17	1.42	0.62
Trade	17	2.09	0.38	1.22	0.50
Transportation and storage	7	2.03	0.25	1.06	0.72
Accommodation and food services	2	2.04	0.22	1.13	0.69
Information and communication	6	0.65	0.34	0.16	0.14
Financial and insurance activities	3	0.88	0.41	0.21	0.26
Professional, scientific and technical activities	6	0.46	0.23	0.14	0.10
Education	2	0.70	0.30	0.23	0.17
Health and social work	7	1.69	0.49	0.77	0.44
Other services	12	1.47	0.28	0.75	0.44
Proportion of highly educated (quintiles)					
Smallest	20 (0-17)	2.58	0.29	1.59	0.71
2nd	20 (17-27)	2.10	0.29	1.23	0.59
3rd	20 (27-40)	1.65	0.24	0.93	0.48
4th	20 (40-63)	0.83	0.27	0.32	0.24
Largest	20 (63-100)	0.65	0.30	0.17	0.19
Proportion of manual workers (quintiles)					
Smallest	20 (0–2)	1.10	0.39	0.43	0.28
2nd	20 (2–20)	1.42	0.36	0.72	0.35
3rd	20 (20–50)	1.12	0.21	0.57	0.35
4th	20 (50–70)	1.98	0.21	1.21	0.56
Largest	20 (70–100)	2.24	0.23	1.35	0.66
Company sickness absence (quintiles)					
Smallest	20 (0-0.6)	0.76	0.18	0.35	0.23
2nd	20 (0.7-3.0)	0.90	0.28	0.33	0.29
3rd	20 (3.0-4.4)	1.61	0.27	0.90	0.43
4th	20 (4.4-6.6)	1.99	0.33	1.08	0.57
Largest	20 (6.6-36.4)	2.63	0.33	1.60	0.69
All	100	1.57	0.28	0.85	0.44

Table 2. Company-level variation in vocational rehabilitation and the effect of adjusting for individual- and company-level characteristics to this variation. Intraclass correlation coefficient (ICC) and standard error (s.e.) and the percentual reduction of the company-level variation after controlling for the individual- and company- level characteristics, compared to the empty model with no covariates

	Empty model	Individual-level characteristics		Individual- and company-level characteristics	
	ICC (s.e.)	ICC (s.e.)	Reduction %	ICC (s.e.)	Reduction %
Any rehabilitation	0.172 (0.011)	0.120 (0.010)	-30	0.095 (0.010)	-45
Mental disorders	0.132 (0.022)	0.089 (0.021)	-32	0.067 (0.022)	-49
Musculoskeletal diseases	0.243 (0.016)	0.151 (0.014)	-38	0.103 (0.014)	-58
Other diseases	0.156 (0.018)	0.108 (0.016)	-31	0.068 (0.016)	-57

Table 3. Associations of the individual-level characteristics with vocational rehabilitation. Fixed effects of the multilevel model presented as odds ratios (OR) and 95% confidence intervals (95% CI)

		Diagnosis for vocational rehabilitation		
	All	Mental disorders	Musculoskeletal diseases	Other diseases
Gender				
Men	1.00	1.00	1.00	1.00
Women	1.44 (1.33-1.57)	1.84 (1.54-2.20)	1.50 (1.34-1.67)	1.10 (0.95-1.28)
Age				
25-34	1.00	1.00	1.00	1.00
35-44	1.81 (1.66-1.96)	1.31 (1.10-1.55)	2.15 (1.91-2.42)	1.65 (1.41-1.93)
45-54	2.27 (2.09-2.46)	1.18 (0.98-1.41)	2.83 (2.52-3.17)	2.24 (1.93-2.61)
55-62	1.08 (0.95-1.22)	0.48 (0.34-0.68)	1.33 (1.12-1.57)	1.24 (1.00-1.55)
Level of education				
Higher tertiary	1.00	1.00	1.00	1.00
Lower tertiary	1.34 (1.08-1.67)	1.20 (0.88-1.64)	2.37 (1.43-3.92)	1.35 (0.92-2.00)
Secondary	2.19 (1.77-2.72)	1.63 (1.19-2.24)	4.43 (2.68-7.32)	2.02 (1.36-2.99)
Primary	2.35 (1.88-2.93)	1.47 (1.02-2.11)	5.01 (3.02-8.33)	2.00 (1.33-3.01)
Social class				
Higher non-manual employees	1.00	1.00	1.00	1.00
Lower non-manual employees	1.63 (1.39-1.90)	1.21 (0.95-1.54)	2.39 (1.77-3.23)	1.72 (1.29-2.30)
Manual workers	3.04 (2.58-3.58)	1.24 (0.92-1.66)	5.09 (3.76-6.90)	3.25 (2.41-4.39)
Other/unknown	2.14 (1.72-2.67)	0.73 (0.43-1.25)	3.81 (2.65-5.47)	2.42 (1.63-3.57)
Sickness absence in 2010				
No	1.00	1.00	1.00	1.00
Yes	6.39 (5.92-6.90)	6.42 (5.37-7.66)	6.26 (5.67-6.90)	4.86 (4.21-5.61)

Table 4. Associations of the company-level characteristics with vocational rehabilitation. Fixed effects of the multilevel model presented as odds ratios (OR) and 95% confidence intervals (95% CI)*

		Diagnosis for vocational rehabilitation		
	All	Mental disorders	Musculoskeletal diseases	Other diseases
Company size (quintiles)				
Lowest	1.00	1.00	1.00	1.00
2nd	1.13 (1.00-1.28)	1.02 (0.79-1.32)	1.13 (0.95-1.34)	1.21 (0.98-1.49)
3rd	1.35 (1.16-1.56)	1.07 (0.81-1.40)	1.49 (1.23-1.81)	1.38 (1.10-1.73)
4th	1.59 (1.32-1.91)	1.29 (0.96-1.73)	1.75 (1.39-2.21)	1.51 (1.17-1.95)
Highest	2.06 (1.57-2.69)	1.78 (1.27-2.51)	2.26 (1.65-3.07)	1.83 (1.35-2.47)
Industry				
Manufacturing	0.97 (0.85-1.11)	0.91 (0.71-1.17)	1.03 (0.86-1.23)	0.94 (0.77-1.15)
Construction	1.25 (1.04-1.50)	0.75 (0.48-1.16)	1.48 (1.17-1.86)	1.16 (0.88-1.54)
Trade	1.00 (0.87-1.15)	0.92 (0.72-1.17)	1.10 (0.91-1.34)	1.07 (0.86-1.32)
Transportation and storage	1.17 (0.97-1.40)	0.98 (0.68-1.40)	1.07 (0.84-1.36)	1.59 (1.24-2.05)
Accommodation and food services	1.02 (0.79-1.33)	0.75 (0.43-1.33)	0.92 (0.65-1.30)	1.52 (1.03-2.24)
Information and communication	1.08 (0.85-1.37)	1.53 (1.11-2.11)	0.92 (0.61-1.40)	0.77 (0.50-1.17)
Financial and insurance activities	0.86 (0.63-1.17)	0.94 (0.61-1.45)	0.89 (0.54-1.48)	0.87 (0.54-1.41)
Professional, scientific and technical activities**	0.73 (0.57-0.93)	1.05 (0.75-1.47)	0.74 (0.49-1.11)	0.48 (0.30-0.76)
Education	0.83 (0.59-1.18)	1.07 (0.67-1.72)	0.90 (0.52-1.56)	0.76 (0.42-1.39)
Health and social work	1.42 (1.19-1.69)	1.40 (1.06-1.85)	1.43 (1.12-1.83)	1.33 (1.00-1.76)
Other services	0.87 (0.75-1.01)	0.94 (0.73-1.22)	0.78 (0.62-0.97)	1.10 (0.88-1.39)
Proportion of highly educated				
Smallest	1.00	1.00	1.00	1.00
2nd	0.99 (0.86-1.13)	1.16 (0.87-1.56)	0.94 (0.79-1.11)	1.03 (0.84-1.26)
3rd	0.90 (0.76-1.06)	1.07 (0.76-1.50)	0.78 (0.64-0.97)	1.03 (0.81-1.32)
4th	0.79 (0.65-0.96)	1.21 (0.84-1.74)	0.56 (0.43-0.73)	0.75 (0.55-1.03)
Largest	0.78 (0.62-0.99)	1.14 (0.76-1.71)	0.53 (0.37-0.75)	0.88 (0.60-1.29)
Proportion of manual workers				
Smallest	1.00	1.00	1.00	1.00
2nd	0.75 (0.62-0.90)	0.79 (0.61-1.04)	0.99 (0.74-1.32)	0.71 (0.53-0.96)
3rd	0.64 (0.51-0.80)	0.61 (0.43-0.87)	0.87 (0.63-1.20)	0.56 (0.39-0.80)
4th	0.77 (0.60-1.00)	0.64 (0.41-0.99)	1.11 (0.78-1.58)	0.67 (0.46-1.00)
Largest	0.76 (0.58-0.99)	0.72 (0.45-1.17)	0.97 (0.67-1.40)	0.68 (0.45-1.03)
Company sickness absence				
Smallest	1.00	1.00	1.00	1.00
2nd	0.99 (0.84-1.15)	1.18 (0.89-1.57)	0.93 (0.75-1.16)	0.96 (0.74-1.24)
3rd	0.99 (0.84-1.18)	1.05 (0.76-1.44)	0.94 (0.74-1.18)	1.12 (0.86-1.47)
4th	1.16 (0.98-1.37)	1.19 (0.86-1.63)	1.15 (0.92-1.44)	1.16 (0.89-1.51)
Largest	1.46 (1.27-1.68)	1.31 (0.97-1.76)	1.54 (1.27-1.87)	1.42 (1.12-1.80)

*Reference category marked with 1.00, industries were compared to the average of all industries.
** Legal and accounting activities, architectural and engineering activities, scientific research and development, and the like