

**Sickness absence in state subsidised re-employment programme as
predictor of labour market attachment among long-term unemployed
individuals: A 6-year cohort study in Finland**

Word count:

Abstract: 247

Main text: 3219

Abstract

Background: Re-employment has been shown to improve health but research on health determinants of re-employment is limited. We examined whether sickness absence during participation in a state subsidy programme was associated with subsequent labour market attachment of long-term unemployed people.

Methods: We linked 18,944 long-term unemployed participants (aged 18-60 years) of a six-month subsidised re-employment programme in Finland to their records of sickness absence and labour market status. We used latent-class growth model to identify labour market attachment trajectories over a 6-year follow-up period; and multinomial logistic regression to investigate the association between sickness absence and labour market attachment trajectories.

Results: We identified four labour market attachment trajectories: ‘strengthening, (77%), ‘delayed’ (6%), ‘leavers’ (10%), and ‘non-attached’ (7%). Sickness absence was associated with an increased risk of belonging to leavers and non-attached trajectories. Having more than 30 sickness absence days during the six-month re-employment programme increased the risk for belonging to the future non-attached trajectory in all age groups, but in particularly for those at ages 30-44 (OR 7.35, 95%CI 4.85-11.14) and 18-29 years (OR 5.38, 95%CI 3.76-7.69). At these ages, having 11-30 sickness absences days was also associated with an elevated risk of belonging to non-attached trajectory, while this risk was lower for those at 45-60 years of age.

Conclusions: Sickness absence during participation in subsidised re-employment programme marked an increased risk for poor labour market attachment during subsequent six years. The risk was particularly high for younger participants who had over 30 sickness absence days.

Introduction

There is a large body of research on the effects of unemployment on health. There is also a growing number of studies suggesting an improved health status among re-employed individuals compared to those who remain unemployed [Schuring et al., 2011, Carlier et al., 2013, van der Noordt et al., 2014; Reuda et al., 2012]. Much of the concern, however, is on how to improve re-employment chances of unemployed people in order to prevent health deterioration resulting from prolonged period of unemployment [Claussen, 1999, Herbig Dragano & Angerer, 2013]. Labour authorities in several European countries have attempted to address this challenge by implementing active labour market policy measures such as job trainings, subsidised re-employment programmes, and re-education courses but the effectiveness of these measures have remained controversial [Puhani & Steiner, 1997; Vuori & Vesalainen, 1999; Kluge, 2010]. Hence, the need for policy makers to evaluate and develop the current measures and to seek for means that would contribute to the realization of the goal of improving re-employment.

Having better understanding of factors that constitute barriers to re-employment is crucial when planning preventive interventions that are aimed at promoting re-employment. Previous studies have identified self-perceived general poor health [Schuring et al., 2013; Lötters et al., 2013; Carlier et al., 2014, Svane-Petersen & Dencker-Larsen, 2016] and musculoskeletal pain [Nwaru, Nygård & Virtanen, 2016] as potential predictors of re-employment. Research also suggests that unemployed persons with physician-diagnosed mental problems [Claussen et al, 1993, Claussen, 1999, Nwaru et al. 2017] are at increased risk of not regaining paid job as compared with their counterparts with no such health problems.

Decisive for the survival on the labour market is the impact of an individual's work ability, and long-term sickness absence is an important risk marker for poor work ability [Labriola & Lund, 2007, Hultin, Lindholm & Möller, 2012] and unemployment [Hesseliuss, 2007, Koopmans, Roden &

Groothoff, 2008]. Both sickness absence and self-rating of work ability during unemployment is complex due to lack of concrete everyday job. Our access to the sickness absence records of unemployed people during their participation in active labour market policy measures (ALMP) afford us with the possibility of addressing the gap of knowledge on work ability of unemployed people. In indicating both health status and ‘employability’, sickness absence of ALMP participants appears as a powerful tool in distinguishing individuals that might be at risk of future poor work ability, and thus in need of special attention.

In our previous study (Nwaru et al, 2017), we identified employment trajectories of re-employed people after their participation in state subsidised re-employment programme. Our aim in the present study is to examine whether sickness absence during such programmes is a predictor of subsequent labour market attachment. We hypothesise that sickness absence would be associated with poor labour market attachment, and that the risk of poor attachment would increase with increasing number of sickness absence days.

METHODS

Design and study population

We derived our study data from the Finnish Public Sector (FPS) study, which is an ongoing prospective study of employees in ten towns and five hospital districts in Finland. General aim of the FPS study is to assess the work life of employees and the impact of work and work-related changes on the employee health and wellbeing [Kivimäki et al., 2009]. The Ethics Committee of the Hospital District of Helsinki and Uusimaa approved the study.

We used the part of FPS study that included data of originally long-term unemployed individuals (N = 23213) who had their first period of subsidised re-employment in the service of the ten towns in 1994-2005. Subsidised re-employment schemes are an essential component of Finland’s ALMP measures. They are designed for long-term unemployed people (by a rule at least 12 months) who

have problems finding job in the regular labour market. Selection of the participants is coordinated by the municipalities in co-operation with the local employment authorities. Individuals are selected if upon assessment, they are considered capable of performing full-time job. The employment contract lasts for six months. For the purposes of this study, we included in the sample the individuals ($n = 18\,944$) who completed the full six months participation in the subsidy programme and excluded those who had to interrupt the period due to poor health, and on the other hand, those who interrupted because of finding a job in the open labour market. Moreover, to be included the participants had to be 18 to 60 years old at the end of the scheme. Those who moved into old-age pension during the six-year follow-up were also excluded.

Data on labour market attachment

Starting at the end of the subsidised re-employment period, subsequent employment of each individual was followed-up for six years, which were divided into 12 six-month period to enable analysis of the labour market attachment trajectories. Labour market attachment here refers to the number of months (0-6) as an employee or entrepreneur during each of the 12-time periods. We obtained information on the employment history from the register of the Finnish Centre for Pensions. This register includes monthly records of all work contracts, as well as that of entrepreneurship that accrue to funding of the statutory earnings-related pension insurance.

Data on sickness absence

We retrieved information on sickness absence from the register of the Social Insurance Institution of Finland (KELA). This nation level register contains records of all sickness absence periods lasting more than ten working days, while costs of shorter periods are covered by the employer [Thorsen et al., 2015]. Like other employees, participants of the subsidised re-employment programme are also entitled to earnings-related sickness allowance. We categorised total number of their sickness absence days across the six-month period as: “no or less than 11 days”, “11-30 days”, and “over 30 days”.

Background variables

Information on gender and age ('18-29', '30-44', and '45-60') were obtained from the employers' registers. Educational level ('basic', 'vocational school', and 'college or university degree') was retrieved from Statistics Finland, while information on chronic diseases was retrieved from the records of the Social Insurance Institution on entitlements to special reimbursements for cost of purchased drugs for severe and chronic diseases. The chronic disease' variable was a summed score of six common diseases (heart disease, rheumatoid arthritis, asthma or chronic obstructive pulmonary disease (COPD), chronic hypertension, and severe mental problems). We categorised participants into two groups based on whether they had one or more or none of the chronic diseases. Information on calendar year in subsidised re-employment was derived from the employer's register, and the years were categorised as: '1994-1997', '1998-2001', and '2002-2005' in order to control for the variations in unemployment and subsidised re-employment rates. We used the information on the 10 towns where the participants had worked as a proxy for dichotomising the area of residence into "small towns" and "big towns". The small towns included Raisio, Naantali, Nokia, Valkeakoski and Virrat, while the big towns consisted of Tampere, Turku, Oulu Vantaa and Espoo.

Statistical analysis

We used latent class growth model with Zero-Inflated Poisson (LCGM-ZIP) [Muthén & Muthén, 2000, Nagin & Odgers, 2010] to identify subgroups within the population that are following a similar pattern of change in the labour market attachment during the six-year follow-up period. We adopted an exploratory approach (i.e. fitted two to six latent classes) in the search for the optimum number of trajectory classes. We specified a quadratic growth term in all models, assuming that labour market attachment will decrease with time after an initial increase. We compared the models (i.e. k and k-1

models) using four selection criteria. First, the Bayesian Information Criteria (BIC), where model with lower BIC values indicated well-fitting model [Kreuter & Muthén, 2000] Second, the Lo Mendell and Rubin Adjusted Likelihood Ratio test (LMR-LRT), where a significant p-value ($p < 0.05$) indicates that the k class fit better than the k-1 class model [Nylund, Asparouhov & Muthén, 2007] Third, the average posterior probabilities of group membership for each class, where higher values (closer to 1) suggest that the trajectories correctly classifies individuals with similar pattern of labour market attachment, and discriminates between individuals with dissimilar attachment patterns [Andruff et al., 2009] Fourth, the practical usefulness of the trajectories. To evaluate this, we examined both the distinctiveness and the sizes (proportions) of each of the trajectory groups [Nagin & Odgers, 2010]. For trajectory groups to serve a useful substantive purpose, they should be distinguishable in terms of their shapes and other explanatory characteristics. They should also be of reasonable sizes (at least five percent) to ensure precision [Muthén & Muthén, 2000; Andruff et al., 2009].

Upon establishing the optimum number of trajectory classes, we then used multinomial logistic regression to investigate the association between sickness absence and labour market attachment trajectories. We performed both unadjusted and adjusted models, where the adjusted model included age, gender, educational level, calendar year in subsidised re-employment programme, chronic conditions, and size of town. We also examined whether age and gender acted as potential modifiers, by entering an interaction term between sickness absence and each of the variables in the fully adjusted model. If the interaction term was significant ($p < 0.05$), the analysis was stratified and the stratum-specific estimates was calculated. We presented results of the regression analyses as odds ratio (OR) with their 95% confidence interval (95% CI). We used Mplus version 7 for LCGA-ZIP and IBM SPSS Statistics for Windows version 23.0 (Armonk, NY: IBM Corp) for the multinomial logistic regression.

RESULTS

Altogether, 1172 of the 18 944 study participants had a sickness absence lasting more than 10 work days during the six month period they were enrolled in the re-employment programme. The absence lasted between 11 and 30 days in 708 (60%) individuals, while the rest had more than 30 sickness absence days. Having over 30 absence days was more common in the older age group, in those with basic educational qualification, and in those who participated in the programme between 2002 and 2005. Participants with chronic diseases were also more likely to have > 30 sickness absence days than those without such diseases (Table 1).

Table 1: Descriptive statistics of study population (N = 18 944)

	Number of participants n (%)	Sickness absence during the six-month participation in the subsidy programme			
		Total number of sickness absence days n (%)	Participants with no absence or absences less than 11 days n (%)	Participants with 11-30 absence days n (%)	Participants with over 30 absence days n (%)
Age					
18-29	9924 (52.4)	554 (5.6)	9370 (94.4)	329 (3.3)	225 (2.3)
30-44	6662 (35.2)	469 (7.0)	6193 (93.0)	293 (4.4)	176 (2.6)
45-60	2358 (12.4)	149 (6.3)	2209 (93.7)	86 (3.6)	63 (2.7)
Gender					
Male	5555 (29.3)	313 (5.6)	5242 (94.4)	185 (3.3)	128 (2.3)
Female	13389 (70.7)	859 (6.4)	12530 (93.6)	523 (3.9)	336 (2.5)
Educational level					
Basic	5251 (27.7)	403 (7.7)	4848 (92.3)	245 (4.7)	158 (3.0)
Vocational school	9525 (50.3)	583 (6.1)	8942 (93.9)	357 (3.7)	226 (2.4)
College/university	4168 (22.0)	186 (4.5)	3982 (95.5)	106 (2.5)	80 (1.9)
Year in subsidized re-employment					
1994-1997	13174 (69.5)	704 (5.3)	12470 (94.7)	427 (3.2)	277 (2.1)
1998-2001	4158 (21.9)	324 (7.8)	3834 (92.2)	199 (4.8)	125 (3.0)
2002-2005	1612 (8.5)	144 (8.9)	1468 (91.1)	82 (5.1)	62 (3.8)
Chronic disease status					
No	17377 (91.7)	1034 (6.0)	16343 (94.0)	633 (3.6)	401 (2.3)
Yes	1567 (8.3)	138 (8.8)	1429 (91.2)	75 (4.8)	63 (4.0)
Size of town					
Small	2329 (12.3)	443 (6.4)	2191 (94.1)	93 (4.0)	45 (1.9)
Big	16615 (87.7)	729 (6.1)	15581 (93.8)	615 (3.7)	419 (2.5)

P-value by Pearson Chi-Square test

On basis of the information criteria, the four trajectory solution discerned most optimally the different labour market attachment trajectories over the six-year follow-up time [Nwaru et al., 2017]. The trajectories were labelled as ‘strengthening’, ‘delayed’, ‘leavers’ and ‘non-attached’. The strengthening trajectory (n = 14577, 77%) represented those with a relatively stable attachment throughout the follow-up time. The delayed trajectory (n = 1101, 6%) included those whose initial weak attachment steadily improved after 36 months. In the leavers trajectory (n = 1970, 10%), the attachment declined with time, while in the non-attached (n = 1296, 7%) the trajectory assumed very low level throughout the follow-up period.

Table 2 shows the associations between sickness absence and labour market attachment trajectories. After adjusting for potential confounders, participants having more than 30 sickness absence days had 5.1 and 2.0 times higher odds of belonging in the ‘non-attached’ and ‘leavers’ trajectories respectively as compared with those with no or less than 11 days. Those with 11-30 sickness absence days also had 2.1-fold and 1.3-fold increased odds of belonging in the ‘non-attached’ and ‘leavers’ trajectories respectively.

Age turned out as the only background variable that interacted significantly ($p = 0.004$) with sickness absence. Table 3 presents the age-stratified associations after controlling for gender, educational level, calendar year in subsidy programme, size of town, and chronic disease. Having more than 30 absence days significantly increased the odds of belonging in the ‘non-attached’ trajectory in all age groups, but the odds was profoundly higher for participants in ages 18-29 (OR 5.38, 95%CI 3.76-7.69) and 30-44 (OR 7.35, 95%CI 4.85-11.14) than for those in ages 45-60 (OR 2.15, 95%CI 1.67-3.96). Having 11-30 sickness absence days also increased the risk for belonging in the poor attachment trajectories for participants in ages 30-44 (‘leavers’ trajectory OR 1.86, 95%CI 1.30-2.68; ‘non-attached trajectory OR 2.92, 95%CI 1.93-4.41), and in the ‘non-attached’ trajectory for those in ages 18-29 (OR 2.13, 95%CI 1.47-3.07). However, for participants in ages 45-60, no such risk was

observed ('leavers' trajectory OR 1.08, 95% CI 0.62-1.88, 'non-attached trajectory' OR 1.20, 95% CI 0.65-2.22).

Table 2. Association between sickness absence and labour market attachment trajectories: results obtained from multinomial logistic regression with their Odds ratio (OR) and their 95% confidence interval (95%CI)

Sickness absence (days)	Trajectories of labour market attachment during the 6-year follow-up		
	Delayed vs. strengthening	Leavers vs. strengthening	Non-attached vs. strengthening
	OR (95%CI)	OR (95%CI)	OR (95%CI)
Unadjusted Model			
No / less than 11	1.00	1.00	1.00
11-30	1.76 (1.33-2.31)	1.29 (1.01-1.63)	2.08 (1.63-2.65)
> 30	2.54 (1.84-3.50)	1.96 (1.49-2.58)	4.98 (3.92-6.32)
Adjusted Model			
No / less than 11	1.00	1.00	1.00
11-30	1.79 (1.36-2.36)	1.27 (1.00-1.62)	2.10 (1.64-2.79)
> 30	2.64 (1.91-3.65)	1.96 (1.48-2.60)	5.06 (3.95-6.49)

Odds ratio adjusted for age, gender, educational level, year in subsidised re-employment, size of town, and chronic diseases

Table 3: Age-stratified association between sickness absence and labour market attachment trajectories: results obtained from multinomial logistic regression with their Odds ratio (OR) and their 95% confidence interval (95%CI)

Sickness absence (days)	Trajectories of labour market attachment during the 6-year follow-up		
	Delayed vs. strengthening	Leavers vs. strengthening	Non-attached vs. strengthening
	OR (95%CI)	OR (95%CI)	OR (95%CI)
Age groups			
18-29			
No/less than 11	1.00	1.00	1.00
11-30	1.73 (1.20-2.50)	0.92 (0.61-1.39)	2.13 (1.47-3.07)
> 30	2.33 (1.48-3.66)	2.23 (1.50-3.30)	5.38 (3.76-7.69)
30-44			
No / less than 11	1.00	1.00	1.00
11-30 days	1.66 (1.03-2.68)	1.86 (1.30-2.68)	2.92 (1.93-4.41)
> 30	2.97 (1.75-5.07)	2.27 (1.41-3.66)	7.35 (4.85-11.14)
45-60			
No / less than 11	1.00	1.00	1.00
11-30	3.80 (1.54-9.39)	1.08 (0.62-1.88)	1.20 (0.65-2.22)
> 30	4.62 (1.70-12.56)	0.89 (0.43-1.81)	2.15 (1.67-3.96)

Odds ratio adjusted for gender, educational level, calendar year in subsidised re-employment, size of town, and chronic diseases

DISCUSSION

We hypothesised that sickness absence during participation in subsidised re-employment scheme is associated with poor labour market attachment in the future, and that the risk increases with increasing number of sickness absence days. The findings were consistent with these hypotheses. We also observed that age modified the association between sickness absence and labour market attachment, with younger unemployed people with sickness absence having an elevated risk for poor labour market attachment while the risk was less among older unemployed people i.e. those between ages 45 and 60 years.

Several studies, especially among long-term unemployed people [Claussen, 1999; Nwaru, Nygård, & Virtanen, 2016; Nwaru et al., 2017] suggest that poor health does reduce the likelihood of regaining paid job. Not only is our study in agreement with earlier studies (as indicated in the association between sickness absence and non-attached trajectory), our findings add that poor health could also constitute a risk factor even among those who regain employment immediately after the subsidised re-employment period (as seen in the association between sickness absence and leavers trajectory). This has an important implication in that the emphasis should not only be on getting the unemployed back to job, but also in ensuring that re-employed people maintain favorable labour market attachment over time.

Earlier studies have suggested that poor health can negatively influence job search behavior of unemployed people which in turn can result in reduced likelihood of finding paid jobs [Carlier et al., 2014]. It has also been suggested that employers may be unwilling to hire job seekers with a history of poor health. Given that long-term sickness absences are mostly associated with ill-health [Marmot et al., 1995] most of which are serious health conditions [Kivimäki et al., 2008] that can interfere with everyday activities, it is plausible that these explanations may account for our findings of an

association between sickness absence and poor labour market attachment among previously long-term unemployed people.

There is evidence, which suggests that younger individuals tend to have fewer long-term sickness absence [Sumanen et al., 2015] and higher chances of re-employment [Schuring et al., 2013, Lötters et al., 2013]. Our findings revealed that younger long-term unemployed people with over 30 sickness absence days had a higher odds for poor labour market attachment than their older counterparts. This finding is similar to that of Virtanen et al.[2006] in which younger temporary employees with high sickness absence were reported to have increased risk of subsequent unemployment, whereas among older temporary employees, no such association was found. Knutsson & Goine [1998] stratified sickness absence diagnosis by age and found that psychiatric diseases and allergy were more prevalent among younger individuals, while cardiovascular diseases were more common among older people. That study also reported that musculoskeletal diseases increased from ages 16 to 44 years, and thereafter levelled off. Virtanen et al [2006] suggested that these differences in the diagnosis underlying sickness absence in younger and older people may explain the age-differences in the association between sickness absence and labour market outcomes.

Schuring et al. [2007] found that a poor self-rated health increased the likelihood of non-re-employment among men, but had less influence among women. In our study, gender did not modify the association between sickness absence and labour market attachment. It appears that the effect of gender on labour market outcomes may be sensitive to the measured health indicator.

Noteworthy, 94 percent of the study subjects were able to work the six month period without needing long sick leaves. The high figure may be due to health-related selection in enrolling individuals into subsidy schemes or due of poor health of those who interrupted the subsidy period (and therefore were excluded from the study sample). But on the other hand, there may have been high 'sickness presence' either due to high motivation of the participants to demonstrate their work ability or due to liberal attitude of the employer to the sometimes relatively poor productivity of these workers. In

sum, those six percent who needed longer-term sick leaves evidently had relatively severe problems in health and work ability- in particular in the areas that were not covered by the chronic conditions adjusted in the analyses.

Also noteworthy is that the trajectory analysis did not produce a group with full, i.e. six month labour market attachment: at the best, in those assuming the trajectory of 'strengthening attachment', the employment rate remained at the level of four months. Thus, we can conclude that subsidised re-employment is leading to permanently full employment relatively seldom, even if the health and work ability of the participant were optimal.

This study strengths include the prospective design with large sample size. The use of registry-based data both for sickness absence and labour market attachment is also a strength, as it eliminated problems relating to attrition, recall bias, and subjective interpretation of both health and employment status. A limitation of our study is the lack of data on the contractual type of the participants during follow-up (i.e. whether they had permanent or temporary jobs or whether the employment was full time or part-time), which according to Virtanen et al. (2006) may influence the relationship between sickness absence and employment outcomes. Another limitation relates to the trajectory classes, which is only an approximation of reality since individuals were assigned to their mostly likely classes based on their average posterior probability values. The inability to adjust for other health variables aside those that were covered in the reimbursement scheme might be another source of residual confounding, although, in the study by Hultin, Lindholm & Möller, [2012], the association between sickness absence and unemployment remained even after controlling for several health indicators. This study finding may not be extrapolated to the unemployment in general since our sample constituted of a selected group of long-term unemployed people i.e. those who participated of the state subsidised re-employment programme. However, on the average, they may be regarded as a representative sample of re-employed people in Finland given that they were pooled from 10 towns in Finland with varying recruitment criteria.

Conclusion

Our study has brought into light the high rates of absence due to sickness among long-term unemployed people who participated in a state subsidised re-employment programme. We have also demonstrated that sickness absence during participation in the subsidy scheme predicts future poor employability i.e. poor labour market attachment. The risk for poor labour market attachment was particularly profound for younger unemployed people. Sick unemployed people face a double-burden by virtue of their health and labour market status, which is why it is important to provide them with adequate support, including health care and rehabilitation, that would enhance both their re-employment chances and their maintaining favourable labour market attachment over the long time.

References

1. Schuring M, Mackenbach J, Voorham T, et al. The effect of re-employment on perceived health. *J Epidemiol Community Health* 2011;65:639-44.
2. Carleir BE, Schuring M, Lötters FJB, et al. The influence of re-employment on quality of life and self-rated health: a longitudinal study among unemployed persons in The Netherlands. *BMC Public Health* 2013;13:505.
3. Van der Noordt M, Ijzelenberg H, Droomers M, et al. Health effects of employment: a systematic review of prospective studies. *Occup Environ Med* 2014;71:730-736.
4. Reuda S, Chambers L, Wilson M et al. Association of returning to work with better health in working-aged adults: a systematic review. *Am J Public Health* 2011;102:541-56.
5. Herbig B, Dragano N, Angerer P. Health in the long-term unemployed. *Deutsches Ärzteblatt International* 2013;110(23-24):413-419.
6. Claussen B. Health and re-employment in a five-year follow-up of long-term unemployed. *Scan J Public Health* 1999;27:94-100.

7. Puhani PA, Steiner V. The effectiveness and efficiency of active labour market policies in Poland. *Empirica* 1997;24(3):209-231.
8. Vuori J, Vesalainen J. Labour market interventions as predictors of re-employment, job-seeking activity and psychological distress among the unemployed. *Journal of Occupational and Organisational Psychology* 1999;72(4):523-538.
9. Kluve J. The effectiveness of European active labour market programmes. *Labour Economics* 2010;17(6):904-918.
10. Schuring M, Robroek SJW, Otten FWJ, Arts CH, Burdorf A. The effects of ill health and socioeconomic status on labour force exit and re-employment: a prospective study with ten years follow-up in the Netherlands. *Scand J Work Environ Health*. 2013; 39(2): 134-143.
11. Lötters F, Carlier B, Bakker B, Borgers N, Schuring M, Burdorf A. The influence of perceived health on labour participation among long term unemployed. *Journal of Occupational Rehabilitation* 2013,23(2):300-308.
12. Calier BE, Schuring M, van Lenthe FJ, Burdorf A. Influence of health on job-search behavior and re-employment: the role of job-search cognitions and coping resources. *J Occupational Rehabilitation* 2014;24(4):670-9
13. Svane-Petersen AC, Dencker-Larsen S. The impact of self-reported health and register-based prescription medicine purchases on re-employment chances: a prospective study. *SSM-Population Health* 2016; 2:580-586.
14. Nwaru CA, Nygård C-H, Virtanen P. Musculoskeletal pain and re-employment among unemployed job seekers: a three-year follow-up study. *BMC Public Health* 2016;16:531 DOI: 10.1186/s12889-016-3200-0.
15. Claussen B, Bjørndal A, Hjort PF. Health and re-employment in a two year follow up of long term unemployed. *J Epidemiol Community Health* 1993;47:14-18.

16. Nwaru CA, Peutere L, Kivimäki M, Pentti J, Vahtera J, Vritanen PJ. Chronic diseases as predictors of labour market attachment after participation in subsidised re-employment programme: a 6-year follow-up study. *J Epidemiol Community Health* 2017;71:1101-1106.
17. Kivimäki M, Head J, Ferrie JE, Singh-Manoux A, Westerlund H, Vahtera J et al. Sickness absence as a prognostic marker for common chronic conditions: analysis of mortality in the GAZEL study. *Occup Environ Med* 2008;65:820-826.
18. Kivimäki M, Head J, Ferrie JE, Shipley MJ, Vahtera J, Marmot MG. Sickness absence as a global measure of health: evidence from mortality in the Whitehall II prospective cohort study. *BMJ* 2003;327-364.
19. Vahtera J, Pentti J, Kivimäki M. Sickness absence as a predictor of mortality among male and female employees. *J Epidemiol Community Health* 2004;58:321-326.
20. Vahtera J, Westerlund H, Ferrie JE et al. All-cause and diagnosis-specific sickness absence as a predictor of sustained suboptimal health: a 14-year follow-up in the GAZEL cohort. *J Epidemiol Community Health* 2010;64(4):311-317.
21. Labriola M, Lund T. Self-reported sickness absence as a risk marker of future disability pension. Prospective findings from the DWECSDREAM study 1990-2004. *Int. J. Med Sci.* 2007;4(3):153-158.
22. Hultin, H, Lindholm C, Möller J. Is there an association between long-term sick leave and disability pension and unemployment beyond the effect of health status? – A cohort study. *PloS ONE* 2012;7(4):e35614. doi:10.1371/journal.pone.0035614.
23. Koopmans PC, Roelen CAM, Groothoff. Frequent and long-term absences as a risk factor for work disability and job termination among employees in the private sector. *Occup Environ Med* 2008; 65:494-499.
24. Hesselius P. Does sickness absence increase the risk of unemployment? *The Journal of Socio-Economics* 2007;36:288-310.

25. Laaksonen M, He L, Pitkaniemi J. The durations of past sickness absences predict future absence episodes. *J Occup Environ Med* 2013;55(1):87-92.
26. Gustafsson K, Marklund S. Consequences of sickness presence and sickness absence on health and work ability: a Swedish prospective cohort study. *Int J Occup Med Environ Health* 2011;24(2):153-65.
27. Kivimaki M, Head J, Ferrie JE, et al. Sickness absence as a prognostic marker for common chronic conditions: analysis of mortality in the GAZEL study. *Occup Environ Med* 2009;65(12):820-826.
28. Thorsen SV, Friberg C, Lundstrøm B et al. Sickness absence in the Nordic countries. Nordic Social Statistical Committee. Copenhagen 2015.
29. Muthén B Muthén LK. Integrating person-centered and variable centered analyses: growth mixture modeling with latent trajectory classes. *Alcohol Clin Exp Res* 2000;24:882-91.
30. Nagin DS, Odgers L. Group-based trajectory modeling in clinical research. *Annu Rev Clin Psychol* 2010;6:109-38.
31. Kreuter F, Muthén B. Analysing criminal trajectory profiles: bridging multilevel and group-based approaches using growth mixture modeling. *J Quant Criminol* 2008;24:1-31.
32. Nylund KL, Asparouhov T, Muthén BO. Deciding on the number of classes in latent class analysis and growth mixture modeling: a Monte Carlo simulation study. *Structural Equation Modeling: A Multidisciplinary Journal* 2007;14:535-69.
33. Andruff H, Carraro N, Thompson A, et al. Latent class growth modelling: a tutorial. *Tutor Quant Methods Psychol* 2009;5:11-24.
34. Virtanen M, Kivimäki M, Vahtera J, Elovainio M, Sund R, Virtanen P, Ferrie JE. Sickness absence as a risk factor for job termination, unemployment, and disability pension among temporary and permanent employees 2006;63:212-217.

35. Marmot M, Feeney A, Shipley M, North F, Syme SL. Sickness absence as a measure of health status and functioning: from the UK Whitehall II study. *Journal of Epidemiology and Community Health* 1995;49:24-130.
36. Sumanen H, Pietiläinen O, Lahti J, Lahelma E, Rahkonen O. Sickness absence among young employees: trends from 2002 to 2013. *J Occup Health* 2015;57:474-481
37. Kuntsson A, Goine H. Occupation and unemployment rates as predictors of long term sickness absence in to Swedish counties. *Soc Sci Med* 1998;47(1):25-31.
38. Schuring M, Burdorf L, Kunst A, Mackenbach J The effects of ill health on entering and maintaining paid employment: evidence in European countries. *J Epidemiol Community Health* 2007;61:597-604.