Do predictors of return to work and recurrence of work disability due to mental disorders vary by age? A cohort study

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Abstract

Background: The extent to which predictors of return to work (RTW) and recurrence of work disability episodes vary by age group is not well understood.

Methods: We examined the associations of sociodemographic and clinical factors with RTW and recurrence after mental disorder-related work disability episodes in a cohort of 10,496 Finnish public sector employees. Disability records were derived from national disability registers between 2005 and 2011**.** Effect modification by age was examined in age groups of 21-34, 35-50 and >50 years.

Results: A total of 16,551 disability episodes from mental disorders were recorded. The likelihood of RTW was elevated in age group 21-34 (HR=1.36, 95% CI=1.28-1.46) and 35-50 years (HR=1.22, 95% CI=1.18-1.26) compared to age group >50 years. The risk of a recurrent episode of work disability was higher in age groups >50 (HR=1.29, 95% CI=1.09-1.52) and 35-50 years (HR=1.20, 95% CI=1.03-1.41) compared to the youngest age group. Employees with depressive disorders were less likely to return to work than employees with neurotic, stress-related and somatoform disorders, and this difference increased with age. Low education was associated with increased risk of recurrent work disability episode in age groups of 50 years or younger, while no such association was observed in age group >50 years.

Conclusion: The importance of depressive symptoms over neurotic, stress-related and somatoform disorders as predictors of delayed return to work increases with age, whereas educational differences in the recurrence of an episode diminish by age.

Introduction

Older age is associated with higher incidence of long-term work disability [1,2,3] and slower return to work (RTW) after a period of disability [4,5]. Moreover, the likelihood of disability pensions increases with age [6]. Nevertheless, the proportion of young adults who are granted work disability pensions due to a mental disorder has increased in several European countries [7,8].

Previous evidence has shown that clinical and socio-economic factors are associated with RTW after a disability episode associated with mental disorders. For example, mood disorders tend to be associated with a longer duration of sick leave than neurotic, stress-related and somatoform disorders [9].The duration of mental health –related disability is also influenced by several socioeconomic factors, such as unemployment, low education, temporary employment, as well as by clinical factors, such as the severity of the disorder, and the presence of comorbid somatic disorders [4,5,10-13]. Although predictors of RTW have rarely been examined from the age perspective, a recent Finnish study among public sector employees suggested that temporary employment might be a risk factor for slow return to work especially among older employees [11].

Some studies have focused on recurrent disability episodes. One study suggested that older age is associated with the recurrence of sickness absence due to a mental disorder [14], other studies have reported low socioeconomic position to be associated with the recurrence of disability [10, 12]. However, it is not known whether the associations of the socioeconomic and clinical factors with the return to work and the recurrence of the work disability vary by age.

In this study of a large cohort of Finnish public sector employees, we examined effect modification in predictors of return to work and recurrence by age, that is, whether the associations of socioeconomic and clinical factors with return to work and recurrence of work

disability due to mental health disorders were different in employees aged 21-34, 35-50, and over 50 years.

Methods

The Finnish Public Sector (FPS) study cohort consists of all full-time employees working for 10 municipalities and 6 hospital districts in Finland for more than 6 months in any year between 1991 and 2005. The study was approved by the Ethics Committee of the Hospital District of Helsinki. For the current study, the population there those employed in the target organizations at 2004 (n=72,235). From these data, we sourced employees who were alive and were not on disability pension or old-age pension at the beginning of the follow-up, on January 1st, 2005 (n=71,099), and who had at least one mental disorder –related absence during the follow-up period from 2005 to the end of 2011 (n=10,617). We excluded 121 employees due to missing data, resulting in an analytic sample of 10,496 employees who contributed to 16,551 episodes of absence due to mental disorder (ICD-10 codes F00-F99) [15] in 2005-2011, for the analysis of the return to work. For the analysis of the recurrence of a work disability due to a mental disorder, we only included only the episodes that could be followed up for at least a year (n=13,716).

Measures

Outcomes

Return to work after absence due to a mental disorder. We obtained information on the beginning and ending dates of all episodes of absence from work due to a mental disorder as the main diagnosis from the Sickness Allowance Register of the Social Insurance Institution (sickness absences lasting for 10 to 365 days) and the registers of the Finnish Centre for Pensions (data on temporary, permanent, full-time, and part-time disability pensions). On the

basis of ICD-10 codes, the diagnoses were classified into diagnostic categories of depressive disorders (F32-34) ("depressive disorders"), neurotic, stress-related and somatoform disorders (F40-48), and all other diagnostic codes ("other mental disorders"). The diagnostic category "other mental disorders" was included in the analyses, but due to the heterogeneity of the category, the estimates for "other" are not displayed in figures, and the hazard ratios or risk ratios are not reported in the tables.

The Social Insurance Institution of Finland pays compensation for sick leaves lasting for 10 to 365 days. If work disability lasts for over a year, the employee can apply for disability pension (registers kept by the Finnish Centre for Pensions). Overlapping and consecutive periods of work disability were combined and the diagnosis of the last period was used for the whole episode. We measured the duration of an episode from the beginning of a compensated disability period to the end of the period, RTW or any economic activity (yes versus no), and the episodes that ended in RTW (without a new episode of work disability within the next 30 days) during the follow-up were defined as cases. The episodes without RTW before the end of 2011, and episodes that ended in old-age pension, or death, were used as the controls.

A recurrent episode was defined as an episode of work disability due to a mental disorder which resulted in a new episode of work disability due to mental disorder within a year from the first episode. Controls were the episodes with no recurrent episode during the following year.

Covariates

Sociodemographic factors. Information regarding age and sex were retrieved from employers' registers. Age at the beginning of follow-up was categorized into age groups of 21-34, 35-50, and over 50 years. Level of education was retrieved from Statistics Finland's

Register of completed education and decrees and was coded as high (over 12 years), intermediate (10 to 12 years), or low (max. nine years). With regard to the type of the job contract, each individual was exclusively categorized as either a permanent employee, or a temporary employee (a job contract with a fixed duration), on 1 January, 2005 (the beginning of follow-up).

Chronic somatic diseases. Chronic somatic disease was defined as having diabetes, hypertension, asthma, rheumatoid arthritis, or cancer at the beginning of the mental disorder-related absence episode. In case of cancer, also cancers during the preceding five years before start of the mental disorder absence episode were included. Apart from cancer, these were derived from the health records of the Special Refund Entitlement Register. This register lists individuals with severe and chronic conditions who are entitled to a higher rate of reimbursement for medicines, a universal social security allowance to all inhabitants in Finland, irrespective of their income. To be eligible for a special reimbursement, a patient's condition must meet explicit predefined criteria, and a written certificate is required from the treating physician. The application is reviewed by a physician from the Social Insurance Institution to determine whether the uniformly defined requirements have been met. Cancer was based on data from the Finnish Cancer Registry, which collects information on all malignant tumours from hospitals and health care providers.

Statistical analysis

To examine the association between age and RTW after a disability episode, we used Cox proportional hazard models for recurrent events. This method of analysis allows each individual to contribute to more than one episode. Correlation between observations was taken into account by calculating standard errors using the robust sandwich variance estimate. The results are presented as hazard ratios (HR) and their 95% confidence intervals (CI). The

event was defined as a return to work and a higher HR meant faster RTW. Each episode of a mental disorder -related work disability was followed from the date of the beginning of the episode to the date of the end of the episode, disability pension with diagnosis other than F00-F99 code, old age pension, death, or the end of the follow-up (31 December 2011), whichever came first. The models were adjusted for age (Model 1), age, sex, level of education, and type of job contract (Model 2), and additionally the presence of chronic somatic disease and the mental disorder diagnostic category (Model 3).

To examine the effect of age on the recurrence of work disability, we applied alternating logistic regression, which is a special type of generalized estimating equations (GEE) method with binary outcomes. The alternating logistic regression algorithm models the association between pairs of responses with log odds ratios, instead of with correlations, as ordinary GEE's do. The results are presented as risk ratios (RR) and their 95% CIs. The event was defined as a new episode after the first episode had ended, and higher RR meant a higher risk of recurrent episodes. Sex, level of education, type of job contract, presence of chronic somatic disease, and diagnostic category were included as covariates.

To assess effect modification - that is, whether the associations between socioeconomic and clinical factors and RTW and the recurrence of work disability differed among the age groups**,** we entered interaction terms into the models including the main effects (age group × sex; age group × education; age group × type of job contract; age group × chronic somatic disease; age group x diagnostic category), and conducted age-stratified analyses. Significant interactions regarding RTW were illustrated using the Kaplan-Meier estimator method, which estimates survival functions to compare time to RTW in subgroups. Significant interactions regarding recurrence were illustrated by frequencies with their 95% CIs in age subgroups. SAS statistical software, version 9.4, was used for all analyses [16].

Results

Table 1 presents the characteristics of the study participants by age group, and shows that 8% were at age 21-34 years, 49% were 35-50 years, and 43% were over 50 years old. Although all employees aged 18 years or more were included in the data, the youngest employees who both had been employed six months before follow-up and had episodes of work disability due to mental disorders, were 21 years old. Employees in the youngest age group had higher education, while employees in the age groups 35-50 and over 50 more often had a permanent job contract and a chronic somatic disease. Eighty-five percent were women which corresponds to the gender distribution in the municipal sector.

During the seven-year follow-up period, 16,551 episodes of disability due to mental disorders were identified. Of these, 15,009 (90%) ended in RTW. In the multivariable-adjusted model (Table 2), the employees in the youngest age group (HR=1.36, 95% CI=1.28-1.46) and in the age group 35-50 years (HR=1.22, 95% CI=1.18-1.26) were more likely to return to work than employees in the oldest age group.

For the analysis of the recurrence of work disability due to a mental disorder, we only included those episodes that could be followed up for at least a year. This resulted in 13,716 episodes. Of these, 3318 (24%) were recurrent, that is, they were preceded by a previous episode with a mental disorder diagnosis. Employees in the oldest age group (RR=1.29, 95% CI=1.09-1.52) and in the age group 35-50 years (RR=1.20, 95% CI=1.03-1.41) more often had recurrent episodes of work disability than employees in the age group of 21-34 years.

We found a significant age × diagnostic category interaction ($p<0.001$) on RTW (Supplementary table 1). This interaction is illustrated in Figure 1, and shows that the difference between the age groups in the RTW in the diagnostic category of neurotic, stress-related and somatoform disorders was small, whereas in the category of depressive disorders, older employees had remarkably lower RTW than employees in other age groups. This was

confirmed in sensitivity analyses adjusted for confounders (see Supplementary Table 2). The adjusted HRs for RTW from a neurotic, stress-related and somatoform disorder-related work disability episode compared to an episode due to depression were 1.74 (95% CI 1.55-1.95) for age group 21-34; 1.85 (95% CI 1.76-1.93) for age group 35-50; and 2.32 (95% CI 2.19-2.46) for age group over 50. The associations of other clinical, socio-economic and work-related factors with RTW in age groups, for which no significant interactions with age were found, are presented in Supplementary Table 2.

The interaction between age and education predicting the recurrence of work disability was also statistically significant (p=0.02, Supplementary Table 1). This interaction is illustrated in Figure 2, showing that the lowest recurrence rate (15%) was found among employees aged 21-34 years with high education. The employees with lower education had more recurrent episodes of work disability than those with high education in age groups of 21-34 and 35-50, but no educational differences were found in employees over 50 years. This was confirmed in the multivariable adjusted sensitivity analysis presented in Supplementary Table 3, where the adjusted RRs for recurrent episode of work disability were as follows: 21-34 years**:** low education 1.67 (95% CI 1.00-2.77); intermediate education 1.41 (95% CI 1.04-1.92) compared to high education. Among employees in the age group 35-50 years, the RRs were: low education 1.42 (95% CI 1.19-1.69); intermediate education 1.13 (95% CI 1.01-1.25) compared to high education. Among employees over 50 years the RRs were: low education 1.02 (95%CI 0.86-1.21); intermediate education 1.04 (95%CI 0.92-1.17) compared to high education. The associations of all other examined clinical and socio-economic factors with the recurrence of work disability in age groups, for which we did not find significant interactions with age, are presented in Supplementary Table 3.

In a further sensitivity analysis, the analysis of the effect modification of age on the association between socioeconomic status and recurrence was repeated using occupational

position instead of education as an indicator of socioeconomic status. The results were congruent with the original analysis (not shown in the tables). Low occupational position associated with the recurrence of work disability among the employees in the youngest age group only. The adjusted RRs for recurrent episodes of work disability were as follows: 21-34 years**:** low position 2.10 (95% CI 1.11-4.0) and intermediate position 1.73 (95% 0.98-3.07) compared to high position. Among employees in the age group 35-50 years RRs were: low position 1.49 (95% CI 1.26-1.75) and intermediate position 1.21 (95% CI 1.05-1.39) compared to high position. Among employees over 50 years RRs were: low position 1.01 (95% 0.85-1.20) and intermediate position 1.10 (95% CI 0.95-1.26) compared to high position.

Discussion

In this large cohort study of Finnish public sector employees we examined age-related differences in predictors in RTW and in the recurrence of mental health -related work disability episodes. We found that employees younger than 50 years were more likely to return to work after a disability episode due to a mental disorder than the employees over 50 years, and the recurrence of the mental disorder related disability was more likely among the employees 35 years or over than among younger employees.

Our findings are in line with previous studies that suggest that older employees have slower RTW after mental disorder-related disability episodes than the younger ones, and they have more recurrent episodes of work disability [4,5]. It is also known that the probability of permanent disability pension increases with age [6] and it has been hypothesized that older employees may be granted disability pension more easily and, that there might be “pushing” factors that lead to exclusion of older employees from the labour market [8].

However, previous studies have not examined whether the predictors of slower RTW or for recurrent disability episodes vary by age group, which we investigated in our more in-depth analyses. Of the clinical factors, having depression rather than a neurotic, stress-related and somatoform disorder was strongly associated with a delayed RTW among older employees, and a smaller difference was found among younger employees.

Instead, low education was associated with an increased risk of having a recurrent disability episode among employees aged 50 years or less but not among older employees.

Among employees who were absent from work due to depression, those over 50 years were the least likely to return to work whereas no age difference was observed within the diagnostic group of neurotic, stress-related and somatoform disorders. This finding may be explained by several factors. It is known that at the individual level, disorder alone does not contribute to RTW, but self-efficacy might also play a role. Depression is associated with a lower return-to-work self-efficacy [17] than other mental disorders. Older employees with depression might be a vulnerable group in relation to the self-efficacy and personal resources needed in RTW. They may also have had several episodes of depression during their working career, which may have taxed their resources. Furthermore, in case the job tasks before the disability episode have been too demanding, older employees with depression might not have resources for new starts, for example vocational training for a different occupation.

Low socioeconomic position has previously been associated with slower RTW from a mental disorder related disability episode [10,12], and low education has been associated with depression-related work disability among younger but not among older employees [18]. We now add to the existing evidence the observation that low education increased the risk of recurrent work disability among employees less than 50 years of age, but did not contribute to the risk among employees over 50 years. Among young employees, low education may be a marker of an early or more severe mental disorder [19,20], which may have hindered

possibilities of achieving higher education. However, in our cohort, having a low education was relatively common in the older age group. Therefore, it is possible that among those who have entered work life earlier, during times when low education was more common, selection to low education due to mental health reasons was not very likely. It is also possible that particularly among young people, low education represents less favourable working conditions, which are known to be a risk factor of poor mental health [21]. Our data also suggest that high education protects younger employees towards recurrent events better than older employees.

The strengths of this study include its large cohort size and long follow-up. Due to the large number of observations, we had sufficient statistical power to detect interaction effects. The main limitation of the study is that RTW was defined as the end of work disability benefit, and thus we cannot be sure that the employee actually returned to salaried work. However, the end of a disability benefit still indicated the end of a disability episode, thus the person was available for the labour market regardless of whether or not they returned to work. In addition, the healthy worker effect should be taken into consideration as a source of selection and confounding bias. The employed usually have lower morbidity rates than the general population. The study sample consisted of people who were in employment at the beginning of follow-up, that is, people who had initially been able to work. In Finland, unemployed people and those out of the labour market for other reasons, such as students and people on parental leave, are also eligible for work disability benefits. Thus, it is likely that our sample had better mental health than the general population. In addition, the fact that eighty-five percent of the studied employees were women, which corresponds to the gender distribution in the municipal sector, has to be taken into consideration.

To conclude, older employees with depression were least likely to return to work after a disability episode due to mental disorders, whereas low education constituted a risk of recurrent work disability among employees aged 50 years or less. These age-related differences in the prognosis of working capacity should be taken into account in intensive preventive actions and treatment of mental disorders in health care.

Figure legends:

Fig. 1 Cumulative probability of return to work stratified by age and diagnosis.

Fig.2 Percentage of recurrent absence episodes due to a mental disorder stratified by age and education.

Competing interests The authors declare that they have no competing interests.

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Table 1. Characteristics of study participants by age group (n=10,496). Figures are frequencies (column percentages).

	21-34 years n= 871	35-50 years n=5143	>50 years n=4482	p-value*
Sex: Men	130 (15)	794 (15)	646 (14)	0.37
Women	741 (85)	4349 (85)	3836 (86)	
Education: Low	45 (5)	355 (7)	651 (15)	
Intermediate	327 (38)	2080 (40)	1726 (39)	
High	499 (57)	2708 (53)	2105 (47)	<0.001
Job contract: Permanent	516 (59)	4435 (86)	4236 (95)	<0.001
Temporary	355 (41)	708 (14)	246 (5)	
Chronic Somatic disease: No	813 (93)	4469 (87)	3345 (75)	<0.001
Yes	58 (7)	674 (13)	1137 (25)	
Diagnostic category **				
Depressive disorder	523 (44)	3860 (47)	3808 (53)	
Neurotic, stress-related and somatoform disorders	513 (43)	3381(42)	2687 (37)	
Other disorders	153 (13)	877 (11)	749 (10)	

*p-value for difference according to X^2 tests

** N refers to number of episodes.

Table 2. Return to work (RTW) and recurrent work disability episodes after an episode of work disability due to a mental disorder by age group.

		Model 1		**Model 2**		**Model 3**	
Age group	**N of episodes / N of episodes ending in RTW (%)**	**Hazard ratio**	**95% CI**	**Hazard ratio**	**95% CI**	**Hazard ratio**	**95% CI**
21-34 years	1189/ 1153 (97)	1.44	1.35-1.53	1.45	1.36-1.55	1.36	1.28-1.46
35-50 years	8118/ 7633 (94)	1.27	1.23-1.32	1.27	1.23-1.32	1.22	1.18-1.26
>50 years	7244/ 6223 (86)	1.00		1.00		1.00	
	N of episodes / N of recurrent episodes (%)	Risk ratio	95% CI	Risk ratio	95% CI	Risk ratio	95% CI
21-34 years	1114 /211 (19)	1.00		1.00		1.00	
35-50 years	7121 /1711 (24)	1.22	1.04-1.43	1.21	1.03-1.42	1.20	1.03-1.41
>50 years	5481 /1396 (25)	1.34	1.14-1.57	1.31	1.11-1.54	1.29	1.09-1.52

Model 1: Unadjusted

Model 2: Adjusted for sex, education, and job contract

Model 3 As model 2 + adjusted for diagnostic group and chronic somatic disease

Figure 1. Cumulative probability of return to work stratified by age and diagnosis.

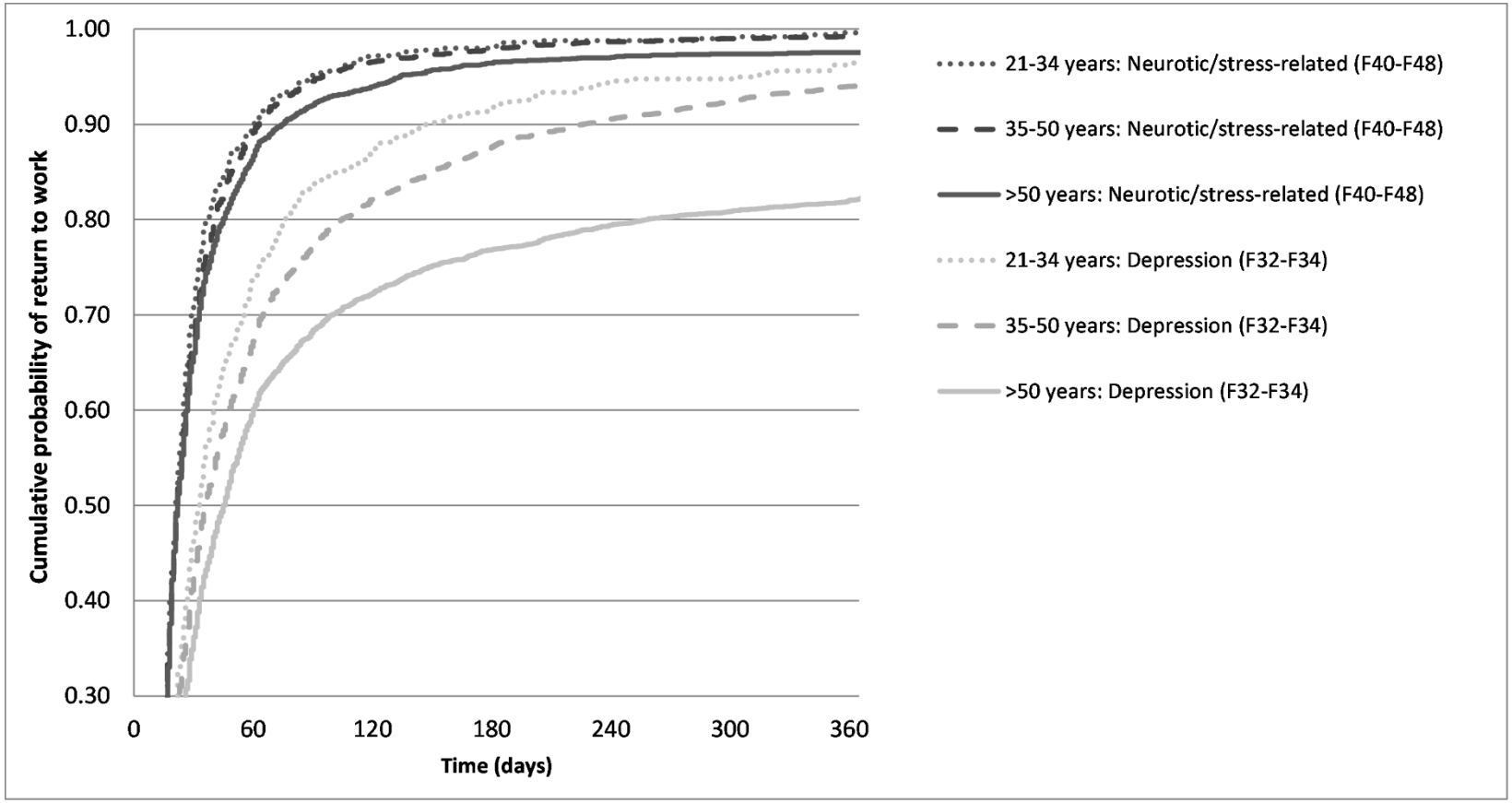
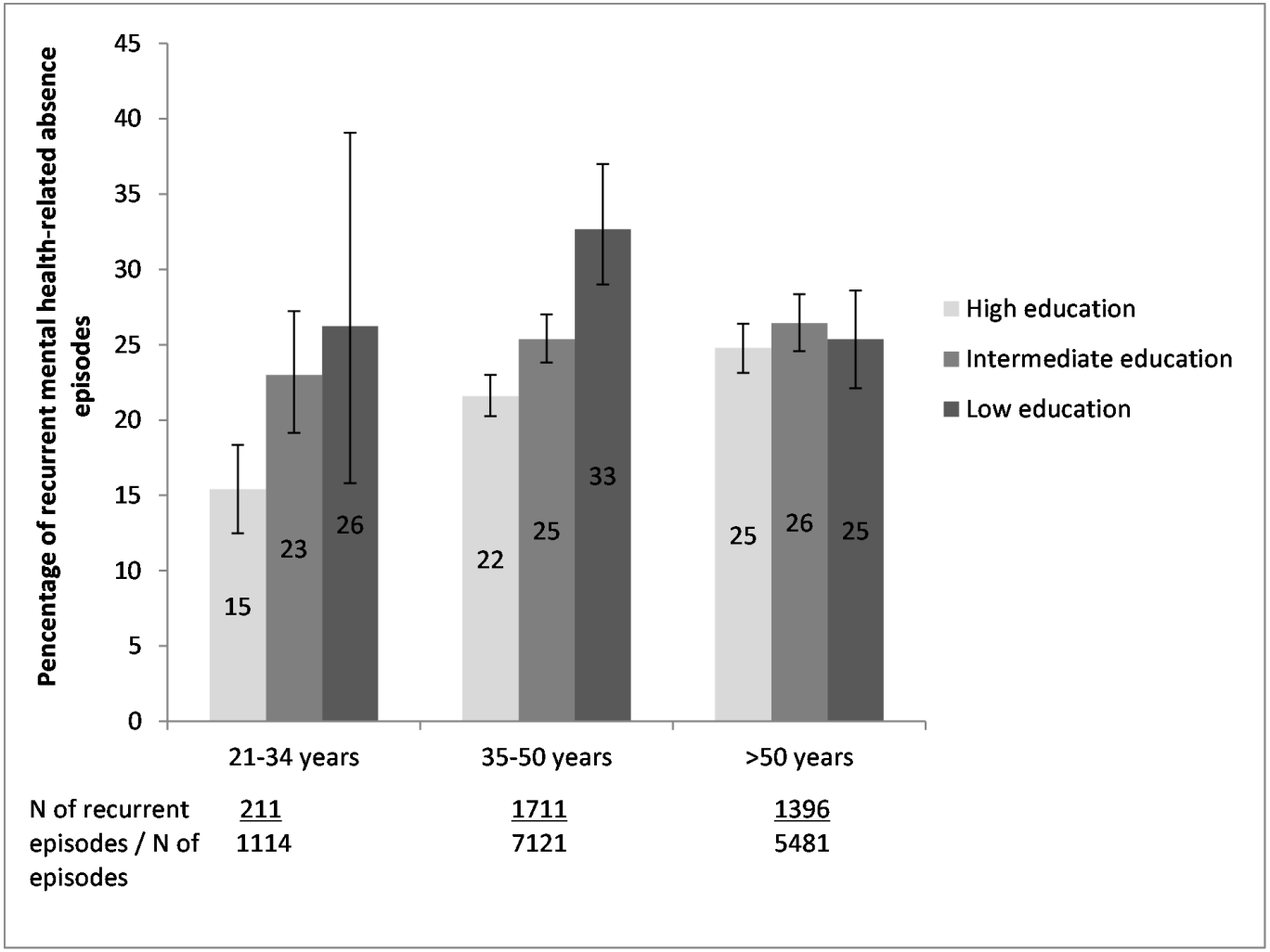


Figure 2. Percentage of recurrent absence episodes due to a mental disorder stratified by age and education.



Supplementary Table 1. P-values for interactions between age group, socio-demographic factors and diagnostic group.

Interaction	Return to work after absence due to a mental disorder, P value	Recurrent episode of absence due to a mental disorder, P-value
Sex and age	0.77	0.37
Education and age	0.72	0.02
Job contract and age	0.85	0.66
Somatic disease and age	0.27	0.29
Diagnostic category and age	<.0001	0.29

All variables are entered simultaneously

Supplementary Table 2. Factors associated with return to work after absence due to a mental disorder by age group (n=16,551 episodes).

	21-34 years, 1189 episodes			**35-50 years, 8118 episodes**			**>50 years, 7244 episodes**		
	Median (IQR) length of absence, days	**Hazard ratio**	**95 % CI**	**Median (IQR) length of absence, days**	**Hazard ratio**	**95 % CI**	**Median (IQR) length of absence, days**	**Hazard ratio**	**95 % CI**
Sex: Women	25 (17-44)	1.00		27 (17-53)	1.00		30 (18-66)	1.00	
Men	28 (17-51)	0.90	0.77-1.05	29 (17-63)	0.94	0.88-1.00	33 (19-91)	0.90	0.83-0.98
Education: Low	28 (17-74)	1.00		28 (17-62)	1.00		28 (18-65)	1.00	
Intermediate	25 (17-42)	1.23	0.91-1.65	27 (17-54)	1.03	0.85-1.10	30 (18-69)	1.00	0.92-1.10
High	26 (17-45)	1.18	0.88-1.58	28 (17-56)	1.00	0.91-1.10	32 (18-70)	0.96	0.88-1.04
Job contract: Temporary	26 (17-45)	1.00		27 (18-56)	1.00		31 (18-71)	1.00	
Permanent	25 (17-45)	1.05	0.94-1.18	28 (17-55)	1.02	0.96-1.09	30 (18-68)	1.03	0.89-1.13
Somatic disease: Yes	28 (20-57)	1.00		30 (18-62)	1.00		32 (18-82)	1.00	
No	25 (17-45)	1.33	1.03-1.71	27 (17-54)	1.10	1.03-1.18	30 (18-66)	1.07	1.01-1.15
Diagnostic category: Depression	32 (20-62)	1.00		35 (20-77)	1.00		44 (22-131)	1.00	
Neurotic, stress-related and somatoform	21 (15-32)	1.74	1.55-1.95	21 (15-35)	1.85	1.76-1.93	21 (16-36)	2.32	2.19-2.46

All variables are entered simultaneously. IQR=Interquartile range

Supplementary Table 3. Factors associated with recurrent absence due to a mental disorder a by age group (n=13,716 episodes)

	21-34 years			**35-50 years**			**>50 years**		
	N of recurrent episodes/N of episodes	**Risk ratio**	**95 % CI**	**N of recurrent episodes/N of episodes**	**Risk ratio**	**95 % CI**	**N of recurrent episodes/N of episodes**	**Risk ratio**	**95 % CI**
Sex:Women	167/938	1.00		1426/6034	1.00		1197/4753	1.00	
Men	44/176	1.35	0.94-1.93	285/1087	1.01	0.88-1.17	199/728	1.07	0.91-1.25
Education: Low	16/61	1.67	1.00-2.77	184/563	1.42	1.19-1.69	194/765	1.02	0.86-1.21
Intermediate	102/443	1.41	1.04-1.92	755/2973	1.13	1.01-1.25	568/2147	1.04	0.92-1.17
High	93/610	1.00		772/3585	1.00		634/2569	1.00	
Job contract: Permanent	128/669	1.00		1509/6190	1.00		1314/5179	1.00	
Temporary	83/445	1.05	0.79-1.41	202/931	0.95	0.82-1.12	82/302	1.06	0.85-1.33
Somatic disease: Yes	21/87	1.38	0.90-2.12	262/970	1.12	0.96-1.30	359/1375	1.01	0.88-1.15
No	190/1027	1.00		1449/6151	1.00		1037/4106	1.00	
Diagnostic category: Depression	107/493	1.00		905/3340	1.00		798/2710	1.00	
Neurotic, stress-related and somatoform	66/486	0.75	0.54-1.03	605/3075	0.86	0.77-0.95	445/2248	0.77	0.68-0.87

All variables are entered simultaneously