Abstract: 250 words; Text 2982 words

29 references; 3 tables; 1 figure

Predictors of employment in young adults with psychiatric work disability

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Running head: Employment after psychiatric work disability

Acknowledgments

The study was funded by the Social Insurance Institution of Finland, which had no role in the design, collection of the data, analysis, interpretation, writing or the submission of the study. The authors report no conflicting interests.

Key words: Disability pension, Employment, Mental disorders, Return-to-work, Rehabilitation

ABSTRACT

Aim

Mental disorders are the leading cause of work disability among young adults in the industrialized world. Factors predicting employment after long-term psychiatric work disability are largely unknown.

Methods

We linked personal and clinical information from the benefit applications and medical certificates of 1163 young adults (18-34 years) with a new-onset fixed-term psychiatric disability pension in 2008 with employment records between 2005 and 2013. The outcomes were starting employment during and being employed at the end of follow-up.

Results

Of the participants, 48% had been employed during and 22% were employed at the end of follow up. Sustained employment history, university education (master's degree) and no recorded psychological symptoms in childhood were associated with both subsequent employment outcomes. Women and participants under 25 years were more likely to start employment. Depression and other mental disorders (vs. psychotic diagnose) and having no comorbid mental disorders or substance abuse were associated with employment at the end of follow up.

Conclusions

Sustained employment history, university education and no recorded psychological symptoms during childhood predict a return to employment among young adults after a fixed-term psychiatric work disability pension. Pro-active interventions in psychological problems during childhood could enhance employment after a period of work disability.

INTRODUCTION

Mental disorders are the leading cause of work disability adults among young adults in many developed countries, and the numbers have increased in recent years (Kaltenbrunner Bernits et al., 2013). Young adults with mental disorders face challenges in gaining employment and launching careers, and this may be further deepened by absence from the labor market because of periods on disability benefits (Davis, Delman, and Duperoy, 2013). Mental health problems and unemployment work in a reciprocal manner, reinforcing each other (Olesen, Butterworth, Leach, Kelaher, and Pirkis, 2013). A long-term sick leave due to mental illness increases the risks of both disability pension and unemployment even when taking health status into account (Hultin, Lindholm, and Möller, 2012). Young adults can be more vulnerable to a prolonged disability period because their working career may not be as consolidated and many of the support models developed for return to work are in the context of a long-term employment relationship and functioning occupational health services (Nigatu et al., 2016). A prolonged exit from the labor market at a young age is a great loss for the individual and society (Greenberg et al., 2003; Berndt et al., 2000). Therefore it is important to identify possibilities for early intervention in young adults with mental disorders to help them gain and stay in employment and successfully return to work after periods of work disability in order to break cycles of exclusion.

Prior research has shown that unemployment, poor labor market status, low level of education, and various forms of adversities during childhood and youth are all linked with work disability, as estimated in middle age (Harkonmäki et al., 2007; Gustafsson, Aronsson, Marklund, Wikman, and Floderus, 2014). Mental health-related clinical factors that have been found to be associated with the risk of work disability include symptoms of depression and anxiety (Mykletun et al., 2006), physical and mental comorbidity (Ahola et al., 2011), suicide attempts (Niederkrotenthaler, 2014), and high alcohol consumption (Sidorchik, Hemmingsson, Romelsjo, and Allebeck, 2012) However, factors

predicting return to employment after a period of long-term psychiatric work disability among young adults are largely unknown and possible factors have rarely been examined in a single analytic setting. Therefore, we examined which demographic and clinical factors predicted the future employment status of young adults after they were granted a fixed-term psychiatric work disability pension.

METHODS

This study is part of the Young Minds at Work study, coordinated by the Finnish Institute of Occupational Health. The sample includes all persons aged 18 to 34 years who received a new-onset fixed-term work disability pension due to a mental disorder from a work pension institute in 2008 in Finland, according to the International Classification of Diseases tenth revision ICD-10, the diagnostic manual used in the Finnish social security system. Work disability benefits can be granted in Finland by a work pension institute after a person has already received 300 days of sickness allowance, and can be granted as fixed-term, because the person is expected to be able to return to the labor market or education in the future. Among young adults (< 35 years), 85 per cent of new psychiatric work disability pensions in Finland are granted as fixed-term. We included only the fixed-term disability pensions. Cases with ICD-codes F10-F69 and F80-F99 as the primary cause were included. Cases with a permanent disability pension and diagnoses of F00-F09 (organic mental disorders) and F70-F79 (mental retardation) were not included in the data. After the exclusions, there were 1181 relevant cases.

Documents of medical history were derived from all of the 20 work pension institutes granting the benefits and could be retrieved for 1163 (98%) of the cases. Using a structured electronic Excel spreadsheet, three researchers collected data from the applications and the physician-certified medical certificates with their attachments from the pension institutes between 8/2012 and 6/2013. In all cases, the medical records included a benefit application and at least one medical certificate. In most cases, several supplemental medical certificates describing treatment history were available. There were also other documents, such as treatment histories from hospitals or outpatient specialized care, documents of rehabilitation examinations with specialist statements (e.g. a psychologist, social worker, or occupational therapist), and employer statements. To assess inter-rater reliability the researchers coded 40 cases as duplicates. The inter-rater agreement was high for the variables derived

from the documents (Kappa range from 0.95 for symptoms during childhood to 0.60 for family history of mental disorders). The ethics committee of Helsinki and Uusimaa Hospital District has approved the study.

Sex, age, and the primary diagnosis were collected from the medical certificates. We grouped the primary diagnoses into four categories: *psychotic* (F20-F29, 34%), *depressive* (F32-F34, 39%), *bipolar* (F30-F31, 14%), and *other mental disorders* (F10-F19, F40-F69, F80-F99, 12%). The most common diagnoses in the other mental disorders group were neurotic, stress-related and somatoform disorders. Vocational education (no vocational education, vocational apprenticeship, vocational school, bachelor's degree, master's degree or higher) was collected from the pension application and the medical records.

Recorded psychological symptoms during childhood (< 18 years of age), substance abuse, the number of psychotropic drugs recorded, and suicide attempts were elicited from the medical certificates and their attachments (all recorded as yes or no). We also collected data on psychiatric and physical comorbidity (secondary diagnoses). Family history of mental disorders and other childhood adversities (parental divorce, learning difficulties, bullying at school, death of a parent, parental alcohol or drug abuse, victimization of childhood neglect or abuse, own serious physical illness, own alcohol or drug abuse during childhood or adolescence, or something else reported as adverse) were collected from the life history reported by the physician in the medical certificates.

Employment outcomes were obtained by using the personal identification number, assigned to all inhabitants in Finland, to link the participants' clinical data to the records of earnings extracted from the Finnish Centre for Pensions. This registry included the number of days in employment, pension,

or on other benefit between January 1, 2005 and December 31, 2013 (i.e., 3 to 4 years before and 5 to 6 years after the work disability episode, depending on the start date of the disability pension in 2008). Sustained employment (yes or no) was defined as being employed for 730 or more days (2 years) during the three years prior to the disability episode.

Statistical analysis

The associations between socio-demographic and clinical factors and the two study outcomes, onset of employment (i.e., the first day in employment) during follow-up and being employed at the end of follow-up (i.e., employed vs. not employed in December 31, 2013), were assessed using Cox proportional-hazards models and logistic regression models. In the Cox proportional-hazards models, person-days of the follow-up were calculated from the first day of the work disability episode onwards, ending on the first day in employment or at the end of the follow-up period (31 December, 2013), whichever came first. The time-dependent interaction terms between each predictor and logarithm of the follow-up period were non-significant, confirming that the proportional hazards assumption was justified (all p values >0.70). The hazard ratios (HRs) and their 95% confidence intervals (95% CIs) for categorical independent variables provided risk estimates in the Cox proportional-hazards models. In the logistic regression models, we estimated employment status at follow-up, i.e., whether or not the participant was employed on the last day of the follow-up period (31 December, 2013). The differences for predictor variables are expressed by calculating odds ratios and their 95% confidence intervals. We adjusted model 1 for age, sex, vocational education and the main diagnosis (psychosis, depression, bipolar disorder, and other). We examined the contributing effect of employment history before the disability pension by additionally adjusting model 1 for sustained employment (model 2). This was done to see whether gaining employment in general is key or if a return to employment after a long period of disability is increasingly difficult. All analyses were performed with SAS 9.4. (SAS Institute Cary, NC).

RESULTS

Of the 1163 participants, 44 per cent were men and 56 per cent were women, with a mean age of 28.5, standard deviation (SD) 4.3 years. Table 1 shows descriptive statistics of the participants by different indicators of employment during the follow up. At the end of the follow up, 45% of the sample were still on full work disability pension while 22% were employed, and 33% were on other benefits e.g. unemployed, maternity leave, or received income support. Of the participants, 48% had had at least one period of employment during the follow up. On average, the subjects received a disability benefit for 1400 days (SD 806) and were employed for 377 days (SD 593) out of the 2060 (average) days of follow up. Those who had had at least one period of employment during the follow up had an average of 746 days of employment (SD 653) and those who were employed at the end of follow up had an average of 1172 days of employment (SD 614). The average time to the first day of employment after the start of the disability pension was 694 days.

Table 2 shows the associations of socio-demographic factors and diagnosis with the onset of the first day of employment and being employed at the end of follow up. A higher likelihood of starting employment was associated with the youngest age group (< 25 years), female sex, higher educational level, a bipolar disorder at baseline (vs. a psychotic diagnose) and having a sustained employment history in the fully adjusted models. Being employed at the end of follow up was more likely among those with depressive and other mental disorders at baseline (vs. a psychotic diagnose), having higher education and having a sustained employment history in the fully adjusted model.

Table 3 shows the associations between clinical factors and the onset of starting employment during the follow up and being employed at the end of the follow up. Having a comorbid mental disorder and a history of substance abuse associated with a lower likelihood of being employed at the end of

the follow up but not with starting employment in the fully adjusted model. Having experienced psychological symptoms during childhood was associated with a lower likelihood of starting employment as well as being employed at the end of the follow up in the fully adjusted model. Figure 1 illustrates the significant predictors of being employed at the end of the follow up for the socio-demographic and clinical factors.

DISCUSSION

In this prospective study of 1163 young adults granted a fixed-term psychiatric disability pension, sustained employment before the disability episode, a higher education level and no recorded history of psychological symptoms during childhood were consistent predictors of starting and maintaining employment in up to a 6-year follow up. Women and the youngest age group (<25 years) were more likely to start employment. Those with a comorbid mental disorder or a history of substance abuse were less likely and those with depressive and other mental disorders at baseline were more likely to be employed at the end of the follow up compared to those with a psychotic diagnose.

Previous employment before disability was a strong predictor of returning to employment in the future, as in many previous studies (Bond, Drake, and Becker, 2008; Laaksonen, and Gould, 2015). Those who had had sustained employment before the disability episode may still have their job contract ongoing, or have maintained contact with a former employer, which facilitates return to work. Higher education levels have also previously been associated with better return to work among employees with psychiatric disability (Laaksonen, and Gould, 2015; Virtanen et al., 2011; Cornelius, van der Klink, Groothoff, and Brouwer, 2011). Those with higher background education may have more resources into adapting to the challenges presented when seeking employment after a period of disability by e.g. learning skills for work that is less taxing given their personal situation. Vocational training or apprenticeship had no association with future employment, but this refers to the background education of the participants. Some rehabilitation measures may use apprenticeships in their processes and they can be effective in integration into employment after a period of disability and could benefit also those with no higher education.

The youngest age group (<25 years) had a faster entry-time into employment than the older age groups, but there were no differences in the likelihood of being employed at the end of the follow up. Many jobs available for the youngest age group are temporary, low-skill level jobs, which may favor younger individuals and because of low requirements for experience, a period on disability pension does not come up in the employment history. The faster return to work in the youngest group may also be related to flexibility in career orientation, as social roles are still unconsolidated. Earlier studies among working age populations show that higher age predicts longer psychiatric disability (Virtanen et al., 2011), but it may be a little surprising that an effect can be seen a sample of young adults.

Compared to the group with psychotic disorders, those with bipolar disorders had a faster entry-time into employment. Depressive disorders and other mental disorders were not associated with a faster entry-time into employment but were associated with higher likelihood of being employed at the end of the follow. This may reflect the clinical pattern of these disorders as persons with bipolar disorder may want to return to work as soon but are unable to sustain employment while those with depressive disorders might need more time to return to work but, once returned, are better able to stay employed. The difficulties in maintaining employment for bipolar patients can relate to stress, symptoms and disruptions in social coping (Levy, and Manove, 2012). The slower access to employment among subjects with unipolar depression may be explained by a tendency to dysfunctional attitudes that make them vulnerable for negative life events (Caspi, Moffit, Newman, and Silva, 1996).

A recorded history of psychological symptoms during childhood was associated with lower likelihood of the employment outcomes even when adjusted for previous employment history.

Thus, the young adults who had had psychological symptoms already in childhood, had more difficulties in *returning* to employment after an episode of work disability. Psychological symptoms during childhood may have hindered developmental tasks and role transition regarding independence, education, and employment resulting in less individual or social resources to draw from when facing the difficult challenge of seeking and getting a job after a period on disability benefit (Bynner, 2013; Veldman, Reijneveld, Ortiz, Verhults, and Bültmann, 2015).

Childhood psychological distress and depression have previously been linked to youth unemployment and level of earnings in adulthood which go above the effects of distress in adulthood (Egan, Daly, and Delaney, 2015; Fletcher, 2013). Adolescents with psychiatric symptoms may develop maladaptive efforts of coping, such as avoidance behavior and substance abuse, which influences their resources in dealing with difficult situations, such as return to employment after a period of disability, later in life. Resilience and social engagement have an impact on emotional and cognitive functioning, and could be promoted early in development by family-, school- and individually-oriented interventions for vulnerable individuals also from a career perspective (Jeste, and Palmer, 2015). Career support models (Bond, Drake, and Becker, 2008; Koivisto, Vuori, and Vinokur, 2010; Drake et al., 2013) could be targeted to vulnerable individuals who have a longer history of psychological symptoms starting from childhood to build their resilience against challenges in getting employment also after a period of disability. Very early markers of psychiatric vulnerability, such as behavioral inhibition and impulsivity seem to predict psychiatric disorders in adolescence and early adulthood and early onset of psychological symptoms seems to predict more severe psychopathology and disability in individuals prone to psychotic disorders (Amminger et al, 2006). Therefore the early onset of symptoms can be in our study also a marker for the severity of the disorder rather than an independent factor.

A comorbid mental disorder and a history of substance abuse were associated with a lower likelihood of being employed at the end of the follow up but were not associated with the onset of employment. A comorbid mental disorder or substance abuse may not prevent a person from becoming employed or returning to work but can make it harder to stay in employment. In a previous analysis of the data we found two latent clusters from the sample based on individual and clinical characteristics: childhood circumstances and comorbidity (Joensuu et al., 2015). These seem to be defining features of both the group composition and the employment prognosis of young adults on disability benefits for a mental disorder.

The strengths of our study were the large representative sample representing 98% of all new psychiatric fixed-term disability pensions granted by the Finnish work pension institutes and high inter-rater reliability. We had 6 years follow up from the national employment register, which covered all the cases. Our data comprised medical history, detailed information about individual and clinical characteristics from the applications and additionally medical certificates and other medical documents. As the quality of the applications and medical certificates can vary, we may have missed some relevant factors. The pension applications and medical certificates are legal documents pertaining to substantial financial benefits increasing the reliability of the information. Part of the information is standard (e.g., ICD-10 diagnosis for disability) but there are also optional, non-instructed parts of the application and certificates. Information on childhood circumstances, symptoms, family history of mental disorders, suicide attempts, and substance abuse were derived non-instructed parts of the application and possible underreported by the applicants or the treating physicians.

Sustained employment before a long-term work psychiatric work disability episode, higher education level, and no history of psychological symptoms during childhood were consistent

significant predictors of future employment among young adults on psychiatric work disability benefit. In early adulthood, individuals with a recorded history of psychological symptoms during childhood can be particularly vulnerable to being excluded from the labor market after a period of work disability.

Contributors

All authors contributed to the design, analyses and interpretation of data. AK and MJ conducted the statistical analyses. MJ wrote the first draft. All authors have revised the manuscript for intellectual content and have approved the final version.

Funding

The Social Insurance Institution of Finland funding the study had no role in the design, collection of the data, analysis, interpretation, writing or the submission of the study.

Competing interest

The authors report no conflicting interests.

Ethics approval

The ethics committee of Helsinki and Uusimaa Hospital District has approved the study.

REFERENCES

Ahola, K., Virtanen, M., Honkonen, T., Isometsä, E., Aromaa, A., Lönnqvist, J. (2011). Common mental disorders and subsequent work disability, a population-based Health 2000 Study. Journal of Affective Disorders, 134, 365-372.

Amminger, G. P., Leicester, S., Yung, A. R., Phillips, L. J., Berger, E., Francey, S. M., Yuen, H. P., McGorry, P. D. (2006). Early-onset of symptoms predicts conversion to non-affective psychosis in ultra-high risk individuals. Schizophrenia Research, 84, 67-76.

Berndt, E. R., Koran, L. M., Finkelstein S. N., Gelenberg, A. J., Kornstein, S. G., Miller, I. M., Thase, M. E., Trapp, G. A., Keller, M. B. (2000). Lost human capital from early-onset chronic depression. American Journal of Psychiatry, 157, 940-7.

Bynner, J. (2013). School to work transitions and wellbeing in a changing labour market. In: Youth and work transitions in changing social landscapes. Helve, H., Evans, K., editors. London: The Tufnell Press.

Bond, G. R., Drake, R., E., Becker, D. R. (2008). An update on randomized controlled trials of evidence-based supported employment. Psychiatric Rehabilitation Journal, 31, 280-90.

Caspi, A., Moffitt, T. E., Newman, D. L., Silva, P. A. (1996). Behavioral Observations at Age 3 Years Predict Adult Psychiatric Disorders. Longitudinal Evidence from a Birth Cohort. Archives of General Psychiatry, 53, 1033-9.

Cornelius, L. R., van der Klink J. J. L., Groothoff, J. W., Brouwer, S. (2011). Prognostic Factors of Long Term Disability Due to Mental Disorders. A Systematic Review. Journal of Occupational Rehabilitation, 21, 259-74.

Davis, M., Delman, J., Duperoy, T. (2013). Employment and careers in young adults with psychiatric disabilities. In: Davis M, editor. Tools for system transformation for young adults with psychiatric disabilities: State of the science papers. Worcester, MA: University of Massachusetts Medical School, Department of Psychiatry, Center for Mental Health Services Research, Transitions RTC.

Drake, R. E., Frey, W., Bond, G. R., Goldman, H. H., Salkever, D., Miller, A., Moore, T. A., Riley, J., Karakus, M., Milfort, R. (2013). Assisting Social Security Disability Insurance beneficiaries with schizophrenia, bipolar disorder, or major depression in returning to work. American Journal of Psychiatry, 170, 1433-41.

Egan, M., Daly, M., Delaney, L. (2015). Childhood psychological distress and youth unemployment: Evidence from two British cohort studies. Social Science & Medicine, 124, 11-17.

Fletcher, J. (2013). Adolescent depression and adult labor market outcomes. Southern Economic Journal, 80, 26-49.

Greenberg, P. E., Kessler, R. C., Birnbaum, H. G., Leong, S. A., Lowe, S. W., Berglund, P. A., Corey-Lisle, P. K. (2003). The economic burden of depression in the United States: how did it change between 1990 and 2000? Journal of Clinical Psychiatry, 64, 1465-75.

Gustafsson, K., Aronsson, G., Marklund, S., Wikman, A., Floderus, B. (2014). Peripheral labour market position and risk of disability pension: a prospective population-based study. BMJ Open ,4,e005230. doi: 10.1136/bmjopen-2014-005230.

Harkonmäki, K., Korkeila, K., Vahtera, J., Kivimäki, M., Suominen, S., Sillanmäki, L., Koskenvuo, M. (2007). Childhood adversities as a predictor of disability retirement. Journal of Epidemiology and Community Health, 61, 479-84.

Hultin, H., Lindholm, C., Möller, J. (2012). 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, 7:e35614. doi:10.1371/journal.pone.0035614.

Jeste, D. V., Palmer, B. W. (2015). Introduction: What is positive psychiatry? In: Positive psychiatry: A clinical handbook. Jeste, D. V., Palmer, B. W. editors. Arlington, VA: American Psychiatric Publishing.

Joensuu, M., Mattila-Holappa, P., Ahola, K., Ervasti, J., Kivimäki, M., Kivekäs, T., Koskinen, A., Vahtera, J., Virtanen, M. (2015). Clustering of adversity in young adults on disability pension due to mental disorders: a latent class analysis. Social Psychiatry & Psychiatric Epidemiology, 51, 281-7.

Kaltenbrunner-Bernitz, B., Grees, N., Jacobson-Randers, M., Geltner, U., Bergendorff, S. (2013). Young adults on disability benefits on 7 countries. Scandinavian Journal of Public Health, 41 (Suppl 12), 3-26.

Koivisto, P., Vuori, J., Vinokur, A. D. (2010). Transition to work: Effects of preparedness and goal construction on employment and depressive symptoms. Journal of Research on Adolescence, 20, 869-92.

Laaksonen, M., Gould, R. (2015). Return to Work After Temporary Disability Pension in Finland. Journal of Occupational Rehabilitation, 25, 471-80.

Levy, B., Manove, E. (2012). Functional Outcome in Bipolar Disorder: The Big Picture. Depression Research and Treatment, 949248: doi:10.1155/2012/949248.

Lewinsohn, P. M., Joiner, T. E. jr, Rohde, P. (2001). Evaluation of cognitive diathesis-stress models in predicting major depressive disorder in adolescents. Journal of Abnormal Psychology, 110, 203-15.

Mykletun, A., Overland, S., Dahl, A. A., Krokstad, S., Bjerkeset, O., Glozier, N., Aarø, L. E., Prince, M. (2006). A population-based cohort study of the effect of common mental disorders on disability pension awards. American Journal of Psychiatry, 163, 1412-18.

Niederkrotenthaler, T., Tinghög, P., Alexanderson, K., Dahlin, M., Beckman, K., Gould, M., Mittendorfer-Rutz, E. (2014). Future risk of labour market marginalization in young suicide attempters - a population-based prospective cohort study. International Journal of Epidemiology, 43, 1520-30.

Nigatu, Y. T., Liu, Y., Uppal, M., McKinney, S., Rao, S., Gillis, K., Wang, J. (2016). Interventions for enhancing return to work in individuals with a common mental illness: systematic review and meta-analysis of randomized controlled trials. Psychological Medicine Sep 9, 1-12. DOI:10.1017/S0033291716002269 [Epub ahead of print]

Olesen, S. C., Butterworth, P., Leach, L. S., Kelaher, M., Pirkis, J. (2013). Mental health affects future employment as job loss affects mental health: findings from a longitudinal population study. BMC Psychiatry,13,144. doi:10.1186/1471-244X-13-144.

Sidorchuk, A., Hemmingsson, T., Romelsjo, A., Allebeck, P. (2012). Alcohol use in adolescence and risk of disability pension: A 39 year follow-up of a population-based conscription survey. PLoS One,7,e42083.

Veldman, K., Reijneveld, S. A., Ortiz, J. A., Verhulst, F. C., Bültmann, U. (2015). Mental health trajectories from childhood to young adulthood affect the educational and employment status of young adults: results from the TRAILS study. Journal of Epidemiology & Community Health, 69, 588-93.

Virtanen, M., Kawachi, I., Oksanen, T., Salo, P., Tuisku, K., Pulkki-Råback, L., Pentti, J., Elovainio, M., Vahtera, J., Kivimäki, M. (2011). Socio-economic differences in long-term psychiatric work disability: prospective cohort study of onset, recovery and recurrence. Occupational & Environmental Medicine, 68, 791-8.

Table 1. Demographic characteristic and employment status during follow up.

		N	Mean (SD) days of employment during an average of 2060 days of follow up		Per cent employed at any time during follow up	Cases	Per cent employed at the end of follow up	Cases
All		1163	377.0	(593.3)	48.0	558	22.0	256
Age	<25	252	299.5	(467.2)	54.8	138	20.2	51
	25-30	366	412.3	(600.0)	49.5	181	23.7	87
	31-34	545	389.2	(637.2)	43.9	239	21.7	118
Sex	Women	648	283.4	(512.4)	41.4	345	25.5	165
	Men	515	451.4	(641.3)	53.2	213	17.7	91
Diagnosis	Psychotic	400	230.4	(455.8)	39.8	159	13.0	52
	Depressive	459	473.9	(663.7)	53.2	244	29.2	134
	Bipolar	167	482.4	(631.0)	58.1	97	24.0	40
	Other	137	352.2	(565.6)	42.3	58	21.9	30
Vocational education	No	357	296.0	(503.9)	47.1	168	20.7	74
	Vocational apprenticeship	44	259.6	(491.7)	36.4	16	15.9	7
	Vocational school	452	375.2	(609.7)	43.8	198	20.1	91
	Bachelor's degree	116	648.4	(732.4)	62.9	73	36.2	42
	Master's degree	59	716.3	(758.5)	66.1	39	39.0	23
Sustained employment before disability	No	781	196.5	(395.6)	36.2	283	15.0	117
	Yes	382	746.0	(741.7)	72.0	275	36.4	139

Abbreviations: SD, standard deviation

Table 2. Demographic predictors of employment after a long-term disability due to mental disorders

		Starting employment during follow-up						Being employed at the end of the follow-up					
		Model 1†			Model 2‡			Model 1†			Model 2‡		
		HR	95%	CI	HR	95%	CI	OR	95%	CI	OR	95%	CI
Age	<25	1			1			1			1		
	25-30	0.81	0.64	1.00	0.67	0.52	0.86	1.07	0.69	1.66	0.95	0.60	1.49
	31-34	0.64	0.50	0.82	0.53	0.41	0.68	0.76	0.49	1.18	0.69	0.44	1.09
Sex	Women	1			1			1			1		
	Men	0.77	0.64	0.93	0.83	0.68	1.00	0.83	0.60	1.14	0.87	0.63	1.21
Diagnosis	Psychotic	1			1			1			1		
	Depressive	1.36	1.10	1.69	1.17	0.94	1.46	2.49	1.70	3.65	2.21	1.49	3.28
	Bipolar	1.59	1.22	2.08	1.31	1.00	1.72	1.93	1.19	3.13	1.60	0.98	2.64
	Other	1.10	0.78	1.54	0.99	0.70	1.39	2.13	1.24	3.65	1.92	1.10	3.36
Vocational education	No	1			1			1			1		
	Vocational apprenticeship	0.85	0.51	1.44	0.75	0.45	1.27	0.82	0.35	1.97	0.75	0.31	1.83
	Vocational school	1.00	0.80	1.24	0.88	0.71	1.10	1.08	0.75	1.56	0.97	0.66	1.42
	Bachelor's degree	1.73	1.28	2.32	1.24	0.92	1.67	2.35	1.43	3.86	1.78	1.06	2.99
	Master's degree	1.98	1.37	2.87	1.65	1.14	2.39	2.59	1.38	4.84	2.13	1.12	4.05
Sustained employment before disability	No	1						1					
	Yes	3.38	2.77	4.03				2.87	2.01	3.94			

Abbreviations: HR, Hazard ratio; OR, Odds ratio; CI, confidence interval. † Adjusted for age, sex, diagnosis and vocational education. ‡ Adjusted for age, sex, diagnosis, vocational education and sustained employment before the disability pension.

Table 3. Clinical predictors of employment after a long-term disability due to mental disorders

			Starting employment during follow-up						Being employed at the end of the follow-up						
			Model 1†			Model 2‡				Model 1†			Model 2‡		
		n (cases)	HR	95%	CI	HR	95%	CI	n (cases)	OR	95%	CI	OR	95%	CI
Hospital treatment	No	395 (190)	1			1			395 (102)	1			1		
	Yes	768 (355)	0.95	0.78	1.16	0.94	0.77	1.15	768 (154)	0.82	0.59	1.14	0.79	0.57	1.11
+ 5 medications used	No	574 (260)	1			1			575 (120)	1			1		
	Yes	588 (285)	0.99	0.82	1.19	0.93	0.77	1.12	588 (136)	0.99	0.72	1.34	0.94	0.69	1.29
Comorbid mental disorder	No	577 (279)	1			1			577 (136)	1			1		
	Yes	586 (266)	0.91	0.75	1.10	0.99	0.82	1.20	586 (120)	0.65	0.47	0.90	0.68	0.49	0.95
Comorbid physical illness	No	1070 (502)	1			1			1070 (237)	1			1		
	Yes	93 (43)	0.99	0.71	1.36	0.99	0.71	1.37	93 (19)	0.77	0.44	1.35	0.76	0.43	1.35
Symptoms during childhood	No	611 (313)	1			1			611 (149)	1			1		
	Yes	552 (232)	0.69	0.57	0.84	0.75	0.62	0.92	552 (107)	0.64	0.46	0.88	0.67	0.48	0.94
Childhood adversity	No	617 (285)	1			1			617 (132)	1			1		
	Yes	546 (260)	0.98	0.81	1.18	1.01	0.84	1.22	546 (124)	0.93	0.68	1.26	0.93	0.68	1.27
Substance abuse	No	797 (397)	1			1			797 (197)	1			1		
	Yes	366 (148)	0.93	0.69	1.24	0.93	0.69	1.24	366 (59)	0.66	0.46	0.95	0.67	0.47	0.98
Family history of mental disorders	No	800 (360)	1			1			800 (170)	1			1		
	Yes	363 (185)	1.08	0.89	1.31	0.97	0.80	1.17	363 (86)	1.01	0.73	1.39	0.91	0.66	1.27
Suicide attempt	No	921 (428)	1			1			921 (204)	1			1		
	Yes	242 (117)	0.94	0.75	1.18	0.94	0.75	1.18	242 (52)	0.73	0.50	1.08	0.71	0.47	1.05

Abbreviations: HR, Hazard ratio; OR, Odds ratio; CI, confidence interval. † Adjusted for age, sex, diagnosis and vocational education. ‡ Adjusted for age, sex, diagnosis, vocational education and sustained employment before the disability pension.

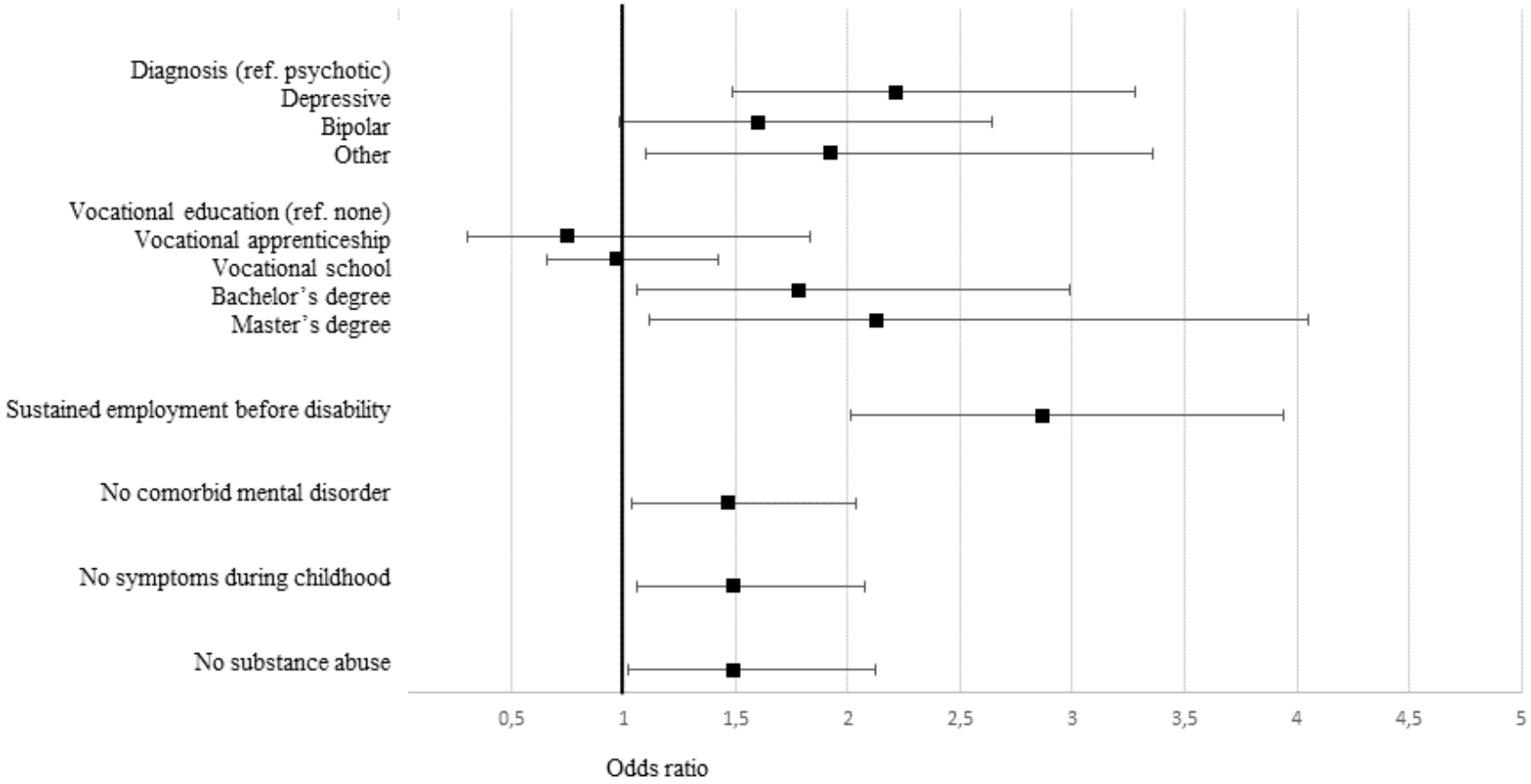

Figure 1. Comparison of significant predictors of being employed at the end of follow up. Odds ratios and their 95% confidence intervals adjusted for age, sex, diagnosis, vocational education and sustained employment before disability. The reference groups for the clinical variables are reversed compared to table 3 for comparability.