

Return to the labour market in schizophrenia and other psychoses – a register-based Northern Finland Birth Cohort 1966 study

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Abstract

Purpose The prospects and predictors of returning to the labour market after long-term work disability in psychoses are unclear. Our aim was to study the proportion and characteristics of persons with schizophrenia and other psychoses who return to the labour market after receiving a disability pension.

Methods In this 50-year follow-up study in the Northern Finland Birth Cohort 1966 (NFBC1966), national registers on demographics, care, and disability pensions were used to detect and characterize individuals who had been on a disability pension for psychiatric reasons. We compared individuals with schizophrenia (SZ, n=223) or other psychoses (OP, n=200) to those with non-psychotic psychiatric disorders (NP, n=1815) regarding demographics and end of pension by cross-tabulations and logistic regression.

Results Of the 170 (74%) persons with SZ who had been on disability pension for a psychiatric reason, 15 (9%) returned to the labour market. Corresponding percentages were 19% for OP and 28% for NP. In SZ, being married, a later onset age of psychosis, and better school performance, and in OP and NP, having children predicted returning to the labour market. In all groups, a shorter length of the latest disability pension associated with returning to the labour market.

Conclusion Although rare, it is possible to return to the labour market after a disability pension due to psychosis. Factors predicting a return to the labour market could be taken into account when planning rehabilitation.

Keywords Schizophrenia · Psychosis · Recovery · Labour market · Disability pension

Introduction

Individuals with schizophrenia often have poor social functioning [1] and a high risk of being outside the labour market [2]. Many European studies report employment rates between 10% and 20% among individuals with schizophrenia [3]. Based on a recent, Finnish nationwide study, 89-94% of persons with schizophrenia are outside the labour force between ages 25 and 52 and they are also at an increased risk of not completing any secondary or higher education [4]. In the Northern Finland Birth Cohort 1966 (NFBC1966) almost 60% of persons with schizophrenia received disability pension during the first 10 years of illness [5], and in another Finnish study 89% of people with schizophrenia or schizoaffective disorder were on permanent or fixed-term disability pension [6]

A recent review highlighted the small but existing potential for clinical and functional recovery from schizophrenia [7]. Whether recovery is possible to the extent of allowing a return to the labour market from a disability pension, has not been studied. In the literature, typically a return to existing part- or full-time employment contract has been studied during a follow-up time of a few weeks to several weeks [8]. Longitudinal studies on return to work (RTW) in schizophrenia and other psychoses are only a few [9, 10], showing that persons with psychosis have lower employment rates after long-term work disability compared to other psychiatric disorders. Virtanen et al. [10] studied psychiatric work disability as long-term sick leave (≥ 90 days) or the receipt of a disability pension among public-sector employees in a prospective cohort study with a mean follow-up of 6.3 years. They found that 46% of people with schizophrenia, schizotypal, and delusional disorders were able to return to work after a disability episode and 41% of them within one year. Higher socioeconomic status predicted RTW in schizophrenia and related disorders [10]. Joensuu et al. [9] found that 40% of people with psychotic disorder were employed at any time during the 5.6 years of follow-up, and that 13% were employed at the end of the follow-up after a new-onset of a fixed-term disability pension.

While we know that occupational functioning among people with schizophrenia is low and a disability pension is common, we know little about persons on a disability pension who are able to return to the labour market and its potential predictors. This information, however, would be, important for patients, clinicians, and society.

The first aim of this follow-up study was to analyse in a general population sample until the age of 50 years, how many persons with psychosis, and especially schizophrenia, return to the labour market after a disability pension, as compared to persons with other psychiatric illnesses. The second aim was to characterize the persons who can return to the labour market.

Methods

Sample

The study was based on the Northern Finland Birth Cohort 1966 (NFBC1966), which is an unselected, general population sample based on 12,058 live-born children with an expected date of birth in 1966 in the provinces of Oulu and Lapland [11]. The cohort members have been followed-up with data collections at different ages, including national register data, and hospital records (<https://www oulu.fi/nfbc/>). In this 50-year follow-up study, we only use data from various registers until the end of 2016, as detailed below.

Psychiatric diagnoses of NFBC1966 members were gained from national registers. The Care Register for Health Care (CRHC) was used to find diagnoses of all general and psychiatric hospitalizations from birth until the end of 2016 and visits to specialized outpatient care in 1998-2016. The Register of Primary Health Care Visits (2011-2016) was used to find outpatient diagnoses in primary care. The data on lifetime diagnoses of individuals were complemented using register information of the Social Insurance Institution of Finland (SII) on received special drug reimbursement (1974-2005), diagnoses for receiving sickness allowances (1974-1999), diagnoses for receiving disability pensions (1981-1998), and information of the Finnish Centre for Pensions (FCP) on diagnoses for receiving disability pensions (1974-2016) [12].

Cohort members diagnosed with any mental disorder based on different versions of the International Classification of Diseases (ICD-8: 290-308, 7092; ICD-9: 290-316; ICD-10: F00-F99) until 2016 were searched from the registers. Individuals with psychiatric disorder were included, excluding those with a diagnosis of organic disorder (e.g. ICD-10 codes F00-F09). The focus was on individuals with schizophrenia and other psychoses, and for comparison purposes, we extracted data concerning those with non-psychotic mental disorder. When setting the diagnosis for the subject (Table 1), we used a hierarchical system, in which the life-time diagnosis for each subject was the one that had the highest position in the hierarchy. The hierarchical order of diagnoses was from the most severe to less severe: schizophrenia, other psychosis, non-psychotic disorders. This hierarchy has been used in previous studies of NFBC1966 [13]. Please see online supplement 1 for further details. We detected 229 (1.9% of the original NFBC1966 sample) subjects with schizophrenia

(SZ), 205 (1.7%) with other psychoses (OP), and 1877 (15.6%) with non-psychotic (and non-organic) psychiatric disorders (NP) in the registers, and these subjects formed the sample of this study.

Start and discontinuation of disability pensions

Registers of the FCP and the SII were used to collect data on disability pensions until the end of the year 2016.

Disability pension status was first analysed based on data of the earnings-related pension system from the FCP for the years 2005–2016. Rates, reasons (i.e. if the reason for the discontinuation was the death of a person), and dates for the start and discontinuation of the disability pension were inspected. Then, we combined data from the FCP to register data from the SII, with data available for whole NFBC 1966 cohort until the end of the year 2000. For part of the sample, we also had register data of the SII for the period 2000–2016. The register of the FCP includes disability pensions of persons who have had salaried work periods/work contracts. The register of the SII includes information on disability pensions of persons who have not been working or who have not earned salary to the extent of accumulating sufficient pension in their life, including persons who have received a disability pension at a relatively young age. Data on sickness allowance were based on the register of the SII which includes all sickness allowance periods that exceed a waiting period consisting normally of 10 working days [14].

In Finland, the SII pays compensation in the form of a sickness allowance for sick leave lasting up to one year [15]. When work disability lasts longer, entitlement to a fixed-term (i.e. temporary) or permanent disability pension is considered. Please see online supplement 1 for further details.

We studied how many persons could return to the labour market after receiving fixed-term or permanent disability pension. Each subject of the sample was followed until the end of the follow-up (31.12.2016), or until death or moving abroad (information from the Population Register). Consecutive disability pension periods were combined into one, and in the case of multiple periods at different times, only the latest one was noted when analysing the discontinuation of the disability pension. TM and EJ analysed the reasons and dates for the discontinuation, and in the case of unclear information, a solution was found by consensus with JM, LAM, and MH. We wanted to focus on psychiatric reasons for disability pension. Therefore, we only present the proportions of disability pensions due to somatic reasons, but we exclude those from further analyses.

A person was considered as having returned to the labour market if disability pension was coded as ended, the person was alive at the time of discontinuation, and no new disability pension was granted. Because the register information was available until the end of the follow-up (31.12.2016), we defined disability pension as ended if it was terminated at least four months before that.

Predictors

The following predictors for return to the labour market were analysed: gender, average school grades, educational level, having children, marital status, age of illness onset, comorbid substance use disorders, proportion of time spent in psychiatric hospitalization after illness onset, age at the initiation of the latest disability pension period, and length of the latest disability pension period. Information on these was gained from national registers (Online supplement 1).

Missing data and excluded subjects

In the whole sample, 1 person with SZ, 5 with OP, and 9 with NP had deceased and did not receive disability pension, and these persons were excluded. All persons who had moved abroad (2 with SZ, 2 with OP, and 24 with NP) were excluded since we did not have information on their pension status.

Information on comorbid substance use disorder was missing from 0–5% and the age at illness onset from 0–3% of people in different diagnostic groups.

Statistical analyses

The background variables in different diagnostic categories were presented for those who had a disability pension for a psychiatric reason and those who did not have it by using cross-tabulation (categorical variables), median with interquartile range, and mean with standard deviation (age of illness onset). Cross-tabulation and the chi-square test were used to compare characteristics of the disability pension separately in different diagnostic groups. Logistic regression was used to examine the association of selected variables with returning to the labour market (instead of having disability pension still running). The results are presented as odds ratios (ORs) with 95% confidence intervals (CIs) and p-values.

P-values <0.05 were considered as statistically significant. The statistical analyses were done using IBM SPSS Statistics, version 25.

Results

Rates and reasons for disability pensions

Before 2016, 177/229 (77%) of persons with schizophrenia received disability pension for any reason (including also somatic disorders). Among persons with other psychosis, 102/205 (50%), and of the non-psychotic group 277/1877 (15%) persons had been on a disability pension.

170 (74%) persons with SZ, 91 (44%) with OP, and 211 (11%) with NP had been on a disability pension for a psychiatric reason, and only they were included in further analyses (Table 2).

Characteristics of the sample

Among persons with SZ, 58% were males. Corresponding percentages were 45% for OP and 49% for NP. In all groups, the most common educational level was secondary education (51-52%), basic or below in 26-29%, and tertiary in 19-22% of the cases. The mean age of psychosis onset was 29.8 years for SZ and 36.9 years for OP, the mean age of illness onset being 34.3 years for NP (Table 2).

The main diagnosis for receiving a disability pension in the SZ group was SZ for 115 (68%) persons and OP or NP for 55 (32%) persons. However, the majority of these 55 persons in SZ group had a diagnosis of psychotic disorder before the disability pension. This information was based on other registers than registers of the FCP and the SII. Among these 55 persons, 29 (53%) had schizophrenia and 14 (25%) had psychosis diagnosis other than schizophrenia in some other register before the initiation of the disability pension. 12 (22%) persons had psychosis diagnosis in the registers only after receiving the disability pension. It is possible that at least some of them have had onset of psychosis before the initiation of the disability pension. None of these 12 persons belonged to the group who had returned to the labour market. In the other two groups, due to the unavailability of decimals of diagnoses (F-codes in ICD-10), it was not possible to separate whether the main diagnosis for a disability pension was OP or NP.

Sixty-one percent of persons with SZ, 90% of persons with OP, and 90% of persons with NP had only one disability pension period ($p < 0.001$, Table 3).

The type of the latest disability pension was a permanent full-time disability pension for 77% of persons with SZ, 68% of OP, and 53% of NP. A fixed-term full-time disability pension was granted for 22% of persons with SZ, 31% of OP, and 39% of NP. Few people had a partial permanent or partial fixed-term disability pension (Table 3). The difference in the type of the latest disability pension between the groups was statistically significant ($p < 0.001$).

Reasons for the discontinuation of the disability pension

In SZ, the disability pensions of 15 (9%) persons ended due to a return to the labour market (Table 3). Corresponding numbers for OP and NP were 17 (19%) and 60 (28%), respectively. The disability pensions of 19 (11%) persons in the SZ group, 7 (8%) in the OP group, and 12 (6%) in the NP group had ended due to death. The difference in reasons for the discontinuation of the disability pension between the groups was statistically significant ($p < 0.001$).

In SZ, 2/15 had returned from a permanent full-time disability pension and 13/15 from a fixed-term full-time disability pension. Corresponding numbers were 4/17 and 13/17 in OP, and 2/60 and 51/60 in NP. In NP, 7/60 had returned from a partial permanent or fixed-term disability pension.

Return to the labour market

When analysing only those who had been granted a permanent full-time disability pension, 2/131 (2%) persons with SZ, 4/62 (6%) with OP, and 2/112 (2%) persons with NP were able to return to the labour market. 13/37 (35%) persons with SZ, 13/28 (46%) with OP, and 51/82 (62%) persons with NP receiving a fixed-term full-time disability pension were able to return to the labour market.

Predictors for return to the labour market

In SZ, not married persons were less likely to return to the labour market than married persons (OR: 0.22; 95% CI: 0.06-0.76), and those with higher average school grades (OR: 2.02; 95% CI: 1.09-3.75) and later age of onset of psychosis (OR: 1.07; 95% CI: 1.02-1.11) were more likely to return to the labour market (Table 4). Those having children were

more likely to return to the labour market in OP (OR: 4.81; 95% CI: 1.26-18.29) and NP (OR: 1.92; 95% CI: 1.02-3.60), but not in SZ.

In all groups, the length of the latest disability pension period was significantly shorter (OR (95% CI) 0.60 (0.45-0.79) in SZ, 0.61 (0.45-0.81) in OP, and 0.61 (0.52-0.72) in NP) in those returning to the labour market than in those with a disability pension still running. Regarding other predictors studied, there were no statistically significant differences in any diagnostic groups.

Discussion

Main findings

Returning to the labour market in schizophrenia (9%) is rare, but possible. Returning to the labour market was more common for other psychoses (19%) or non-psychotic psychiatric disorders (28%). It also tends to be more common after a fixed-term than after a permanent disability pension in all diagnostic groups.

In SZ, being married, higher onset age of psychosis, and better average school grades predicted returning to the labour market. Having children predicted returning to the labour market in OP and NP. A shorter length of the latest disability pension predicted returning to the labour market in all groups.

Comparison to previous studies

Our number of persons with SZ returning to the labour market is in line with the employment rates of 10-20% [3] and with the unemployment rates of 89-94% found in previous studies [4]. In addition, in a recent Finnish study, only 10.5% of persons with a psychiatric disability pension returned to work within the five years of follow-up [20].

Among psychiatric disorders, psychotic diagnoses have the poorest occupational outcomes after long-term work disability [9, 10]. In parallel to few previous studies on RTW, our study shows even lower numbers of returnees to working life (in our study SZ 9% and OP 19% vs. in Joensuu et al. [9] 40-% and Virtanen et al. [10] 46% of persons with schizophrenia, schizotypal, or delusional disorder). This difference can be explained by the facts that we focused on more severe stages of work disability, we had a notably longer follow-up, and different settings since the register of SII includes subjects with no lifetime attachment to working life because of disabilities occurring at a younger age. Permanent disability pensions are granted based on a much lower probability of regaining working ability compared to fixed-term disability pensions and long-term sick leaves. Virtanen et al. [10] defined work disability broadly as long-term sick leave (≥ 90 days) or the receipt of disability pension without separating permanent and fixed-term ones. Following their recommendation, we were able to study permanent and temporary disability pensions separately.

Our sample differs from many other studies because we used the most severe lifetime diagnoses detected from several registers. Whereas previous studies have analysed returning to the labour market of persons who have received disability pension due to diagnosis of schizophrenia or psychosis (regardless of their previous and forthcoming diagnoses in treatment settings), we analysed returning to the labour market among those with lifetime schizophrenia or other psychosis. Hence, we have explored a very good functioning outcome during life course among people with psychotic disorders.

Returning from a disability pension in schizophrenia is not common. This is reflected in the high proportion of permanent full-time disability pensions (77%) granted for those with SZ, indicating a severe illness. On the other hand, this may reflect the views of mental health care workers thinking that it is not possible to recover occupationally from schizophrenia [21]. However, many persons with schizophrenia spectrum disorders can do some work and vocational rehabilitation should be offered for those who wish to work [22]. Implementing individual placement and support also seems to increase the employment rates for people with mental health problems [23]. One reason for the importance of vocational rehabilitation is that employment is beneficial for mental health [24].

Our results give us hope by showing possibilities for returning to the labour market even after long-term disability pensions. Some studies have reported better longitudinal employment outcomes for patients receiving early intervention services, but the association is not clear [25]. Vocational or educational rehabilitation seems to improve involvement in school or work in early-phase psychosis [26]. Since in our study returning to the labour market was possible also in later stages of illness, this kind of rehabilitation services should be offered not only to all patients in the early phase but also later during the course of illness.

In OP or NP, the rates of permanent full-time disability pensions (68% in OP and 53% in NP) were somewhat lower than in schizophrenia. That may partly explain the higher proportions of people who can return to the labour market compared to SZ. The total number of persons with schizophrenia on a disability pension at some point (77%) was also remarkably larger compared to OP (50%) or NP (15%).

Schizophrenia patients are at high risk of being outside the labour market [2]. The societal costs of schizophrenia, including lost productivity due to being outside the labour force, are worth noting [1]. Also, in terms of treatment, supporting the ability to work or study is an important goal in schizophrenia because it can further promote functional, clinical, and social outcomes [27].

In an extensive review, higher cognitive functioning was identified as a significant predictor of good vocational outcome in schizophrenia [28]. In our study, higher school marks at the age of 16 years predicted a return to the labour market. Better school performance has also previously been found as a predictor of not being on a disability pension in schizophrenia in NFBC1966 [29]. Higher school marks may be a proxy of cognitive functioning and reserve, and in this sense, our results are in line with previous studies [28]. Other predictors of good vocational outcome in the study by Tsang et al. [28] included a lower level of negative symptoms, a higher level of education, social support and skills, a previous history of successful employment, younger age, and use of rehabilitation services. According to large meta-analyses, the association between onset age and outcomes in schizophrenia is not clear, though some studies report a significant relationship between those [28, 30]. Later illness onset has been associated with many other good outcomes in schizophrenia [30].

Tsang et al. [28] found that being married or cohabiting predicts better vocational outcome, and our results are in line with this. Being single has also been associated with worse occupational outcomes in earlier follow-ups in NFBC1966 [5]. Having children predicted returning to the labour market in OP and NP but not in SZ. Schizophrenia patients without children have been found to have a more severe and prolonged course of illness than those with children [31], while the association between having children and outcome in other psychoses is less known. We found that a shorter length of the latest disability pension predicts returning to the labour market in SZ, OP, and NP. Having long-term sick leave due to mental illness has been reported increasing the risks of both disability pension and unemployment [32].

Our results show that factors that have previously been reported as having an association with better outcomes in schizophrenia are also predictors for a return to the labour market. These findings can be utilised when planning treatment and rehabilitation for persons with schizophrenia. For example, effective planning and implementation of occupational rehabilitation could be offered especially for those who have markers of better possibilities to return to the labour market.

Strengths and limitations

NFBC1966 offered us a unique possibility to examine the return to the labour market in psychoses and non-psychotic disorders with full register-based data coverage of an unselected, general population sample covering all branches of economy and occupations over a time period of 50 years.

Due to the long follow-up, period effects should be noted. Especially after the 1990s, both funding possibilities and views on occupational rehabilitation changed. Possibilities for rehabilitation aiming to return to work increased and rehabilitation became more working life oriented. On the other hand, working life has become more demanding psychologically, cognitively, and socially, hampering employment opportunities especially for those with schizophrenia. In addition, changes in grounds for granting disability pensions may have differed during decades. The use of three diagnostic systems and differences in diagnostic practices over the decades, may have influenced not only variation in the prevalence of different diagnoses but also differences in the granting of disability pensions.

An important strength of the study was high-quality register data. In Finland, the universal, both earnings- and citizenship-based and comprehensively registered disability pension system gave us an opportunity to examine different phases of pension periods very precisely. Unlike in previous studies, our data also covered persons who had not been able to enter working life due to early illness onset or other reasons. This is an important aspect regarding psychoses which are among the main reasons for disability in early working age. Due to this, our results fully describe the psychiatric disability-related outcomes in all persons with schizophrenia and other mental disorders in this population. The small number of cases, however, especially when analysing the predictors, limits the statistical power. An important limitation in our study was the potential missing of non-psychotic mental disorders. Our registers probably include the majority of persons with psychosis [5], but those with NP treated solely in occupational health or private sector and those without any treatment are not included in the registers we used, and may have been missed. Also, the national data collection of the visits to specialized outpatient care started in 1998 when the cohort members were over 30 years old. Thus, the prevalence

observed for non-psychotic mental disorders (15.6%) may be underestimated. Our prevalence observed for any mental disorder (19.2%) is within the range of prevalence estimates (12.2-48.6%) found in a cross-national study [33], but lower than lifetime prevalence in the Dunedin Study (85.8%) [34]. It is possible that some persons with NP may have had psychotic symptoms or a diagnosis, but they have not ended up in the registers. However, we did our best to classify the subjects by using several national registers.

One problem among studies focusing on disability- and employment-related outcomes is in defining and measuring the outcome. There are no standard definitions describing a good occupational outcome or being employed in schizophrenia research [3]. There is also a difference in returning to competitive work compared to returning to the labour market, which we could unfortunately not assess with the data available for this study. Nevertheless, we studied the ending of disability pension due to psychiatric reasons and returning to the labour market with an unambiguous measure, showing clear differences between the diagnostic groups studied.

Conclusion

Although schizophrenia is associated with long-term work disability, it is possible to return to the labour market after periods on a disability pension. Among other psychoses and non-psychotic disorders, returning to the labour market is somewhat more common than in schizophrenia. To improve the occupational outcome for people with psychoses, in the future, it is important to study factors associated with a return to the labour market and work in large samples with long follow-up.

Declarations

Funding

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Conflict of interest

The authors declare that they have no conflict of interest.

Ethical statement

The NFBC1966 study has been approved by the Ethics Committee of the Northern Ostrobothnia Hospital District and relevant keepers of the registers. The study has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. According to Finnish legislation, individual consents are not needed for solely register-based studies.

Availability of data and material

The data is under gated access. Data is available from the NFBC project center (NFBCprojectcenter@oulu.fi) for researchers who meet the criteria for accessing confidential data (www.oulu.fi/nfbc).

Code availability

Not applicable.

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Table 1. Diagnostic categories based on ICD 8-10 used in the current study.

	ICD-8 (1968-86)	ICD-9 (1987-95)	ICD-10 (1996-)
Schizophrenia (SZ)	2950-2959, 297	2950-2959, 297	F20, F22, F24, F25
Other Psychosis (OP)	2960-2969, 2980-2983, 2988, 2989, 299	2961E, 2962E, 2963E, 2964E, 2967, 2988, 2989	F23, F28, F29, F302, F312, F315, F323, F333
Non-psychotic psychiatric disorder (NP)	295-308, 310-315, 7092, (excluding those with diagnosis of SZ or OP described above)	295-309, 311-319, (excluding those with diagnosis of SZ or OP described above)	F101, F102, F111, F112, F121, F122, F131, F132, F141, F142, F151, F152, F161, F162, F171, F172, F181, F182, F191, F192, and F20-F99, (excluding those with diagnosis of SZ or OP described above)

Table 2. Characteristics of the sample

Variable	Schizophrenia			Other psychosis			Non-psychotic psychiatric disorder		
	Disability pension for a psychiatric reason (n=170)	No disability pension (n=53)	Total (n=223)	Disability pension for a psychiatric reason (n=91)	No disability pension (n=109)	Total (n=200)	Disability pension for a psychiatric reason (n=211)	No disability pension (n=1604)	Total (n=1815)
Gender, n (%)									
Male	99 (58.2)	31 (58.5)	130 (58.3)	41 (45.1)	59 (54.1)	100 (50.0)	104 (49.3)	761 (47.4)	865 (47.7)
Female	71 (41.8)	22 (41.5)	93 (41.7)	50 (54.9)	50 (45.9)	100 (50.0)	107 (50.7)	843 (52.6)	950 (52.3)
Educational level^a, n (%)									
Basic or below	49 (28.8)	5 (9.4)	54 (24.2)	24 (26.4)	17 (15.6)	41 (20.5)	57 (27.0)	226 (14.1)	283 (15.6)
Secondary	89 (52.4)	25 (47.2)	114 (51.1)	47 (51.6)	59 (54.1)	106 (53.0)	107 (50.7)	807 (50.3)	914 (50.4)
Tertiary	32 (18.8)	23 (43.4)	55 (24.7)	20 (22.0)	33 (30.3)	53 (26.5)	47 (22.3)	571 (35.6)	618 (34.0)
Having children^b, n (%)									
No	123 (72.4)	26 (49.1)	149 (66.8)	38 (41.8)	36 (33.0)	74 (37.0)	85 (40.3)	331 (20.6)	416 (22.9)
Yes	47 (27.6)	27 (50.9)	74 (33.2)	53 (58.2)	73 (67.0)	126 (63.0)	126 (59.7)	1273 (79.4)	1399 (77.1)
Marital status^b, n (%)									
Not married	125 (73.5)	35 (66.0)	160 (71.7)	38 (41.8)	46 (42.2)	84 (42.0)	90 (42.7)	469 (29.2)	559 (30.8)
Married	20 (11.8)	10 (18.9)	30 (13.5)	22 (24.2)	27 (24.8)	49 (24.5)	62 (29.4)	729 (45.4)	791 (43.6)
Divorced or widowed	25 (14.7)	8 (15.1)	33 (14.8)	31 (34.1)	36 (33.0)	67 (33.5)	59 (28.0)	406 (25.3)	465 (25.6)
Age of illness onset, psychosis (years), Mean (SD)									
Md (IQR)	29.3 (23.1-35.5)	31.5 (26.5-38.0)	30.3 (24.1-36.6)	36.9 (9.4)	36.4 (9.1)	36.7 (9.2)			
Age of illness onset, non-psychotic psychiatric disorder (years), Mean (SD)									
Md (IQR)							34.3 (10.3)	38.2 (11.5)	37.7 (11.4)
							36.5 (28.4-42.1)	42.1 (32.5-47.1)	41.3 (32.1-46.7)

^aUntil 2015^bUntil June 2016

Abbreviations: SD = standard deviation, Md = median, IQR = interquartile range

Table 3. Characteristics of the disability pension

	Schizophrenia (n=170)		Other psychosis (n=91)		Non-psychotic psychiatric disorder (n=211)	
	n	%	n	%	n	%
Number of disability pension periods, n/%						
One	103	60.6	82	90.1	189	89.6
Two or more	67	39.4	9	9.9	22	10.4
Type of the disability pension received, n/%						
Permanent full-time disability pension	131	77.1	62	68.1	112	53.1
Fixed-term full-time disability pension	37	21.8	28	30.8	82	38.9
Partial permanent or fixed-term disability pension	2	1.2	1	1.1	17	8.1
Disability pension status at the end of the follow-up, n/%						
Disability pension ended due to death	19	11.2	7	7.7	12	5.7
Disability pension still running	136	80.0	67	73.6	139	65.9
Disability pension ended and alive (i.e. return to labour market)	15	8.8	17	18.7	60	28.4

Table 4. Predictors for return to labour market by the age of 50 years (vs. disability pension still running)

Variable	Schizophrenia				Other psychosis				Non-psychotic psychiatric disorder			
	Return to labour market (n=15)	Disability pension still running (n=136)	OR (95% CI)	p-value	Return to labour market (n=17)	Disability pension still running (n=67)	OR (95% CI)	p-value	Return to labour market (n=60)	Disability pension still running (n=139)	OR (95% CI)	p-value
Gender, n (%)				0.680				0.627				0.939
Male ¹	9 (60.0)	74 (54.4)	1		6 (35.3)	28 (41.8)	1		29 (48.3)	68 (48.9)	1	
Female	6 (40.0)	62 (45.6)	0.80 (0.27-2.36)		11 (64.7)	39 (58.2)	1.32 (0.44-3.98)		31 (51.7)	71 (51.1)	1.02 (0.56-1.88)	
Average school grades at the age of 16 years, Mean (SD)	7.8 (0.9)	7.3 (0.9)	2.02 (1.09-3.75)	0.026	7.6 (1.0)	7.4 (1.0)	1.19 (0.68-2.07)	0.552	7.2 (0.9)	7.2 (0.9)	1.06 (0.74-1.52)	0.740
Educational level^a, n (%)				0.754				0.297				0.227
Basic or below ¹	4 (26.7)	35 (25.7)	1		2 (11.8)	21 (31.3)	1		12 (20.0)	40 (28.8)	1	
Secondary	7 (46.7)	75 (55.1)	0.82 (0.22-2.97)		10 (58.8)	32 (47.8)	3.28 (0.65-16.50)		30 (50.0)	71 (51.1)	1.41 (0.65-3.05)	
Tertiary	4 (26.7)	26 (19.1)	1.35 (0.31-5.89)		5 (29.4)	14 (20.9)	3.75 (0.64-22.10)		18 (30.0)	28 (20.1)	2.14 (0.89-5.14)	
Having children^b, n (%)				0.218				0.021				0.044
No ¹	9 (60.0)	102 (75.0)	1		3 (17.6)	34 (50.7)	1		20 (33.3)	68 (48.9)	1	
Yes	6 (40.0)	34 (25.0)	2.00 (0.66-6.03)		14 (82.4)	33 (49.3)	4.81 (1.26-18.29)		40 (66.7)	71 (51.1)	1.92 (1.02-3.60)	
Marital status^b, n (%)				0.049				0.688				0.082
Married ¹	5 (33.3)	14 (10.3)	1		6 (35.3)	17 (25.4)	1		24 (40.0)	42 (30.2)	1	
Not married	8 (53.3)	111 (81.6)	0.22 (0.06-0.76)		8 (47.1)	34 (50.7)	0.67 (0.20-2.23)		22 (36.7)	75 (54.0)	0.51 (0.26-1.02)	
Divorced or widowed	2 (13.3)	11 (8.1)	0.55 (0.09-3.35)		3 (17.6)	16 (23.9)	0.53 (0.11-2.49)		14 (23.3)	22 (15.8)	1.11 (0.48-2.57)	
Comorbid substance use disorder^a, n (%)				0.113				0.440				0.150
No ¹	10 (66.7)	113 (83.7)	1		13 (76.5)	44 (66.7)	1		41 (71.9)	109 (81.3)	1	
Yes	5 (33.3)	22 (16.3)	2.57 (0.80-8.25)		4 (23.5)	22 (33.3)	0.62 (0.18-2.11)		16 (28.1)	25 (18.7)	1.70 (0.83-3.51)	
Age of illness onset, psychosis, Md (IQR)	33.3 (30.4-45.7)	29.1 (23.5-35.7)	1.07 (1.02-1.11)	0.005	40.7 (34.7-44.1)	38.4 (33.0-44.5)	1.03 (0.97-1.10)	0.351				
Age of illness onset, non-psychotic psychiatric disorder, Md (IQR)									35.4 (28.6-41.2)	37.9 (29.4-43.0)	0.99 (0.97-1.02)	0.688
Age at the initiation of the latest disability pension period, Md (IQR)	35.6 (28.0-41.6)	32.2 (25.5-40.1)	1.04 (0.98-1.11)	0.199	38.7 (34.5-44.9)	39.0 (26.7-43.0)	1.05 (0.98-1.11)	0.150	40.8 (36.3-44.8)	42.3 (35.2-45.3)	1.01 (0.97-1.04)	0.708
Length of the latest disability pension period (years), Md (IQR)	2.3 (1.1-6.7)	17.6 (10.2-25.0)	0.60 (0.45-0.79)	<0.001	1.8 (0.7-6.8)	11.2 (7.1-23.8)	0.61 (0.45-0.81)	<0.001	1.7 (1.0-3.1)	8.2 (5.3-15.3)	0.61 (0.52-0.72)	<0.001
Proportion of time (%) spent in psychiatric hospitalization after illness onset^b, Md (IQR)	8.2 (12.9-35.1)	7.7 (2.3-18.0)	2.85 (0.64-12.65)	0.168	2.2 (0.2-9.2)	3.8 (0.2-8.4)	4.62 (0.19-114.0)	0.350	0.0 (0.0-1.9)	0.0 (0.0-1.4)	10.56 (0.44-254.8)	0.147

¹Reference category.^aUntil 2015^bStatus at the initiation of the latest disability pension period

Abbreviations: OR = odds ratio, CI = confidence interval, Md = median, IQR = interquartile range, SD = standard deviation

Online supplement 1

Methods

Sample

In this study, the focus was on individuals with schizophrenia (SZ) and other psychoses (OP), and for comparison purposes, we extracted data concerning those with non-psychotic mental disorder (NP). When setting the diagnosis for the subject, we used a hierarchical system, in which the life-time diagnosis for each subject was the one that had the highest position in the hierarchy. The hierarchical order of diagnoses was from the most severe to less severe the following: schizophrenia, other psychosis (including e.g. psychotic affective disorders and psychosis not otherwise specified), non-psychotic disorders. For example, subjects with a schizophrenia diagnosis might have had some other psychotic or non-psychotic diagnoses, but their life-time diagnosis was interpreted to be SZ. Subjects with non-psychotic disorder should not have had a diagnosis of psychosis in any of the registers, because such a diagnosis would have moved them to the respective psychosis diagnostic group.

Start and discontinuation of disability pensions

In Finland, the Social Insurance Institution of Finland (SII) pays compensation in the form of a sickness allowance for sick leave lasting up to one year [1]. When work disability lasts longer, entitlement to a fixed-term (i.e. temporary) or permanent disability pension is considered. A fixed-term disability pension is paid for a fixed period, and it can be granted to persons who have lost their ability to work temporarily but whose illness or handicap is expected to improve through treatment and rehabilitation. A permanent disability pension is granted directly if return to work (RTW) is unlikely, or after the fixed-term disability pension when treatment and rehabilitation have not led to sufficient results. Multiple periods of fixed-term disability pensions are possible. In the earnings-based work pension system, both types of disability pensions can be granted as part-time benefits. When the person reaches statutory retirement age, the disability pension is replaced by an old-age pension.

Predictors

Predictors for return to the labour market were analysed. *Gender* was based on national population register information. Data concerning the study subjects' *average school grades* when leaving basic education at the age of 16 years were gathered from the 1982 register of the Finnish national application system for upper secondary education. School grades vary between 4-10 [2], as regulated by the National Board of Education [3]. The register of Statistics Finland (until 2015) was used to gain information on *educational level*. The different educational level categories used in the study were based on the International Standard Classification of Education [4]. Basic or below level included early childhood education, primary education, and lower secondary education. Secondary level included upper secondary education and post-secondary non-tertiary education. Tertiary education included short-cycle tertiary education, Bachelor or equivalent level, Master or equivalent level, and doctoral or equivalent level. The register of the Digital and Population Data Services Agency (until June 2016) was used to gain information on *having children* by the end of the follow-up and *marital status* at the initiation of the latest disability pension period. We note that cohabiting is not registered and thus cannot be distinguished from our data.

Illness onset, meaning the age of the first occurrence of psychosis for SZ and OP groups and non-psychotic psychiatric disorder for NP, was defined by using the Care Register for Health Care (CRHC), the SII registers of reimbursable medicines, and Finnish outpatient registers. Data on *substance use disorders* (until 2015) were gathered from the CRHC and outpatient registers and data on *the proportion of time spent in psychiatric hospitalization* after illness onset (until 2015) from the CRHC from the beginning of the cohort in 1966. The proportion of time spent in psychiatric hospitalization after illness onset was calculated for the time period between the patient's first psychotic episode and the initiation of the latest disability pension period [5]. Information on *age at the initiation* and *length of the latest disability pension periods* (in years) until the end of 2016 were gathered using the registers of the Finnish Centre for Pensions (FCP) and the SII.

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