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Childhood determinants for early psychiatric disability pension – a ten-year follow-up study of the 1987 Finnish Birth Cohort

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Compliance with ethical standards

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Abstract

Background: Mental disorders can affect work ability and lead to early exit from the labour market through disability pension.

Aims: This study aimed to identify childhood determinants of psychiatric disability pension in early adulthood.

Methods: The 1987 Finnish Birth Cohort includes a complete census of children born in a single year. The children were followed up from birth until 31.12.2012 using official registers maintained by the Finnish authorities. Risk factors for disability pension were examined in the full 1987 cohort (N=58,739) and among children who had received mental health care (N=9,599). Odds ratios were calculated for disability pension due to all mental disorders and separately for schizophrenia, depressive and anxiety, and other mental and behavioural disorders in association to childhood determinants.

Results: Altogether, 1.4% of cohort members had retired due to mental disorders in 2003–2012. In the full 1987 cohort, female-sex, parental divorce and social assistance, both mother's and father's psychiatric care, and mother's psychiatric disability pension increased the risk for disability pension due to mental disorders. Among children who had received mental health care, risk factors for psychiatric disability pension were father's psychiatric care and mother's psychiatric disability pension.

Conclusions: Childhood determinants were related to the risk of psychiatric disability pension before the age of 25. The risk factors varied by the diagnosis of the disability pension. Using knowledge of this study's risk factors should enable the identification of adolescents and young adults in general population and especially in the mental health care population who are at greatest risk of receipt of psychiatric disability pension.

Keywords Disability pension, risk factors, economic and social adversity, parental mental health problem, childhood,

Introduction

Based on previous research, approximately one in every four to five children and adolescents aged under age 25 years suffers from some kind of mental disorder (Patel, Flisher, Hetrick & McGorry, 2007) Three out of four mental disorders begin during childhood and adolescence (Kessler et al., 2005; Patel et al., 2007). Earlier studies have identified various risk factors for childhood and adolescence mental disorders and include various genetic (Patterson, 2007), pre- and perinatal (Paananen, Ristikari, Merikukka & Gissler, 2013; Robinson et al., 2008), individual (Paananen et al., 2013), as well as environmental (Paananen et al., 2013; Thompson et al., 2007) determinants. In addition, various family-related risk factors have been identified. These include determinants describing economic and social adversity in childhood, such as teenage motherhood (Paananen et al., 2013), parental divorce (Lansford, 2009), receipt of social assistance (Paananen et al., 2013), and low parental education (Mikkonen, Moustgaard, Remes & Martikainen, 2016). Further a determinant of mental health problems in the offspring is having a parent treated at specialised psychiatric care (Hancock, Mitrou, Shipley, Lawrence & Zubrick, 2013; Mikkonen et al., 2016; Paananen et al., 2013). It is known, that when several risk factors occur simultaneously, the risk of mental disorders increases (Wille, Bettge, Ravens-Sieberer & BELLA study group).

Mental disorders threaten work ability at an earlier age than the most common somatic illnesses negatively impacting work ability (Ahola et al., 2014), and thus can lead to a temporary or even permanent departure from the labour market, bringing severe economic and psychosocial consequences (Gustafsson, Aronsson, MArklund, Wikman & Floderus, 2014). In Finland, the incidence of psychiatric disability pension has greatly decreased in the general population in the last decade (Official Statistics of Finland, 2017a). However, the incidence of psychiatric disability pension has clearly increased among those aged 16–24 years and is still increasing (Official Statistics of Finland, 2017b). Mental disorders were the cause for disability pension in 77% of cases for those aged 16–24 in 2012; in 2016, the figure was 81%. A similar development has been witnessed in many other European countries (Kaltenbrunner Bernitz, Grees, Jakobsson Randers, Gerner & Bergendorff, 2013). Every second young person with disability pension has had more than one mental health diagnosis (Ahola et al., 2014). The high level of mental-health-based disability among the young is of significant societal concern, as the functioning of the Nordic welfare state depends on high labour market participation (Olesen et al., 2012; Smith et al., 2006).

There is less information about adolescents' risk factors for receipt of psychiatric disability pension than risk factors for mental disorders. Psychiatric disability pension is associated with a number of well-known individual risk factors, such as female-sex, childhood disease, care placement, and low educational level (Ahola et al.,

2014; Gravseth et al., 2007; Harkko, Kouvonen & Virtanen, 2016; Joensuu et al., 2015; Mattila-Holappa, Joensuu, Ahola, Vahtera & Virtanen, 2016). However, knowledge is scarce when talking about family-related risk factors for receipt of psychiatric disability pension. A Norwegian study (Gravseth et al., 2007) found out that parental low-educational level, marital status, and parental receipt of disability pension increased the risk of children's receipt of disability pension. A Finnish study (Harkko et al., 2016) found that parent's receipt of social assistance increased the likelihood of disability pension receipt among the offspring.

The aim of this study was to examine the association of childhood determinants describing economic and social adversity and determinants of parental mental health problems with later disability pension receipt due to mental and behavioural disorders. All mental disorders and separately some specific mental health disorder groups (schizophrenia, depressive and anxiety, and other mental and behavioural disorders) were examined from the age of 16–25 in a complete census of children born in 1987. Furthermore, the association of childhood determinants to later psychiatric disability pension receipt among cohort members who had received mental health care was examined for the period 1987–2012. The mental health care population was chosen to examine risk factors for psychiatric disability pension receipt, when children had been diagnosed with a mental disorder. The purpose was to examine what risk factors are so severe that they lead children with a mental health care history to registering for a disability pension. To support policy for work ability development, we need knowledge of the risk factors in different population groups. Thus, the 1987 Finnish Birth Cohort data were used with register linkages to several comprehensive Finnish national registers.

Methods

The 1987 Finnish Birth Cohort

The 1987 Finnish Birth Cohort (FBC) is a longitudinal nationwide follow-up study including a complete census of all infants born in a single year, 1987, which was subsequently followed up repeatedly until the end 2012 (Paananen & Gissler, 2011; Paananen, Ristikari, Merikukka, Rämö & Gissler, 2012; Ristikari et al., 2016). All members of the cohort surviving the perinatal period were included in the 1987 FBC (N=59,476). The 1987 FBC includes detailed forms of documentation on cohort member's own and their parent's health status and social circumstances, and covers the perinatal period to early adulthood. The data were gathered from Finnish national registers (Gissler & Haukka, 2004) and combined to census data by means of the personal identity code.

This study included all children who were born in 1987 and were alive on their 16th birthday, at which age registering for a disability pension is possible. However, 238 children who had registered for a disability pension due to intellectual disability and 188 children who had ever had specialized in- or outpatient hospitalization due to intellectual disability (International Classification of Diseases (ICD) -9th Revision: 317–319 and ICD-10: F70–F79, primary and secondary diagnoses) were excluded. Thus, the study population includes 58,739 cohort members (98.8% of initial cohort). A sub-population of children who had received mental health care (F00-F69, F80–F99) in an inpatient or outpatient clinics before the end 2012 was also constructed (N=9,599, 16.3% of the study population). The study obtained an approval (§28/2009) from the Ethical Review Board of the National Institute for Health and Welfare (THL) and appropriate permissions to use the confidential register data in scientific research from all register-keeping organizations were also obtained.

Data on disability pension

A person who has an illness that reduces work ability may be granted a disability pension. Our study included disability pension data from both the national and the earnings-related pension scheme. According to the Finnish national pension scheme, a disability pension may be granted to a person aged 16–64 years. However, the disability pension is not granted to persons under the age of 20 years unless possibilities for rehabilitative efforts have been investigated. Thus, a rehabilitation allowance for young persons can be granted to those aged 16–19 years. From the earnings-related pension scheme, a disability pension can be granted to a person aged 18–62 years on condition that the person has a work history that has accrued pension. Besides health-related factors, the person's possibilities of earning a living are taken into account in the decision. In the earnings-related pension scheme, it is further required that the incapacity for work is

estimated to last for at least one year. The disability pension can be granted either as a temporary disability pension, called as fixed-term rehabilitation allowance, or as a permanent disability pension. In general, fixed-term rehabilitation will be granted first, especially for young people, and this can be extended after the specified period of time. In this extension process, a diagnosis can be changed. Permanent disability pensions can be granted in the early ages in serious and obvious cases, such as when person has an intellectual disability. However, entitlement to disability pension will be assessed again if work ability is restored or a new profession is obtained. (Finnish Centre for Pensions [ETK] and Social Insurance Institution [KELA], 2015) In this study, the term disability pension was used to refer not only to permanent disability pension but to temporary disability pension as well. The disability pension is a benefit, and work ability should be restored during a disability pension episode.

Cohort members were divided into five disability pension groups according to the primary (ICD-10) diagnosis underlying their claim for disability pension during the study's follow-up period 2003–2012: 1) all mental and behavioural disorders, excluding intellectual disability, (F00–F69, F80–F99), 2) schizophrenia disorders only (F20–F29), 3) depressive and anxiety disorders only (F30–F49), 4) other mental and behavioural disorders only (F00–F19, F50–F69 and F80–F99) and 5) several psychiatric diagnoses from the disability pension groups 2–4 (forming the group with multiple different diagnoses).

Data on psychiatric care and psychiatric diagnoses

The Finnish Hospital Discharge Register (HDR), maintained by THL, covers all inpatient care episodes from all Finnish hospitals since 1969 and all specialized-cares outpatient visits in public hospitals since 1998 (ETK and KELA, 2015; Gissler & Haukka, 2004; Sund, 2012). The cohort members' psychiatric inpatient and outpatient care episodes were collected from the HDR by given primary and secondary diagnoses. The mental health care population was constructed using diagnosis-level data. It is possible to be diagnosed elsewhere than in specialized care, such as in primary care and in private medical center.

Data on characteristics of family's economic and social adversity

Data on cohort members' sex and mother's age at the time of the cohort member's birth were obtained from the Medical Birth Register (MBR), kept by THL. Cohort members' mother was classified as a teenage mother (yes/no), if the age of the mother was under 20 years at the time of birth. Data on divorces of cohort members' biological parents (yes/no) after the births of the cohort member up until the 16th birthday were received from the Population Information

System, kept by the Population Register Centre. Information on cohabitation was not available. Recipients of social assistance are registered by THL. Social assistance refers to last-resort financial assistance provided by social services to a household from municipal funds when other sources of income are insufficient to ensure that the basic needs of a person or a family are met. Parental social assistance (yes/no) was used as an indicator of the family's financial hardship during the time period 1987–2002, when a cohort member was aged under 16 years. Information on mothers' and fathers' highest level of education was received from Statistics Finland. Education was classified into *basic level qualification* (up to 9 years), *upper secondary level education* (11–12 years in education), *lowest level tertiary education* (education lasts 2 to 3 years after upper secondary education) and *tertiary degree education* or higher level education (duration of 3 to 4 years or more after upper secondary education).

Data on characteristics of parental mental health problems

Psychiatric inpatient and outpatient care visits in psychiatric departments and hospitals for the mothers and fathers (yes/no) were collected from the HDR, using all mental health diagnoses on the condition that the episode started between the cohort member's birth and the 16th birthday. Psychiatric (illnesses with) diagnoses were reported using the ICD-9 diagnostic system (290–319) from 1987 to 1995 and the ICD-10 diagnostic system (F00–F99) from 1996 onwards.

Data on parents' disability pension receipt were obtained from the pension register, kept by Finnish Centre for Pensions (ETK). Parental disability pension was divided onto three groups: no disability pension due to somatic or psychiatric disorders, only somatic disability pension, and psychiatric disability pension during the cohort member's first 15 years of living (1987–2003).

Statistical methods

Binary logistic regression analyses from the generalized linear model family were used to calculate the odds ratios (ORs) and 95% confidence intervals (CIs) for disability pension due to mental and behavioural disorders in association with childhood risk factors in the full 1987 cohort and in the sub-population of those who had received mental care. First, bivariate associations between childhood determinants and the five disability pension groups were examined separately, adjusting by sex (adjusted model I, Table 2 & 3). Second, manual backward stepwise models were constructed that included all statistically significant childhood determinants and sex in the models at once (adjusted model II, Table 2 & 3). Significance was set at a p-value of 0.05. Interaction terms between the determinants were not

taken into account. All analyses were performed using IBM SPSS Statistics for Windows, version 22.0 (Armonk, NY: IBM Corp).

Results

In the full 1987 cohort, mental disorders were the reason for 77.3% of all disability pension claims, while in the mental health care population, the corresponding figure was 86.8%. Altogether, 837 (1.4 %) cohort members born in 1987 were granted a psychiatric disability pension between the ages 16–24 years. The psychiatric disability pension was granted for 441 (52.7%) children from the national pension scheme and for 27 (3.2%) from the statutory earnings-related pension scheme. The other 369 (44.1%) children received a psychiatric disability pension from both schemes. Of retired cohort members with disability, 750 (89.6%) had a fixed-term rehabilitation allowance and 87 (10.4%) a permanent disability pension.

Table 1 shows distributions of disability pension groups and childhood risk factors both in the 1987 cohort and among children who had received mental health care. Disability pensions due to depressive and anxiety disorders (F30–39) of all granted psychiatric disability pensions were the most common disability pensions among the 1987 cohort members (46.4%) and among children who had received mental health care (45.3%). The next most common reason for disability pension receipt was schizophrenia disorder (F20–29) (27.4% and 28.3% respectively). In total 15.7% of the 1987 cohort members, and 16.1% of children who had received mental health care had granted disability pensions due to several psychiatric diagnoses. Among children who had received mental health care, there were more females, teenage mothers (of cohort members), divorced parents and parents who had received social assistance than in the full 1987 cohort. Also, mothers and fathers more often had a low level of education. Further, in the mental health care population, there were also more mothers and fathers who had received psychiatric care, and somatic and psychiatric disability pension.

Childhood risk factors for receipt of disability pension due to mental disorders in the full 1987 cohort

Table 2 shows the risk factors for disability pension receipt in the 1987 cohort. After adjustment by all childhood determinants, the risk factors for disability pension due to mental and behavioural disorders were female sex, parental divorce, parental receipt of social assistance as economic and social adversity risk factors, and mother's and father's psychiatric care and mother's receipt of psychiatric disability pension as parental mental health risk factors. Females had a 1.36-times higher risk (95% CI 1.19–1.56) for disability pension receipt due to mental disorders than males.

For disability pension due to schizophrenia disorders, the risk factors were male sex, parental receipt of social assistance, mother's and father's receipt of disability pension, and mother's receipt of psychiatric disability

pension. Females had lower risk than males. For disability pension due to depressive and anxiety disorders, female sex, teenage motherhood, parental divorce, and parental receipt of social assistance increased the risk of receiving a disability pension. However, mother's lowest level (OR 0.61, 95% CI 0.44–0.85) and upper secondary level education (OR 0.73, 95% CI 0.55–0.97) decreased the risk for disability pension receipt due to anxiety and depression disorders compared mothers who had a tertiary degree. Moreover, mother's and father's psychiatric care, and both mother's both somatic and psychiatric disability pension receipt were risk factors. The only risk factor for disability pension receipt due to other mental and behavioural disorders was the father's psychiatric care. Risk factors for disability pension by several different psychiatric diagnoses (from at least two disability pension groups), were female sex, parental divorce, father's psychiatric care, and mother's psychiatric disability pension.

Childhood risk factors for receipt of disability pension due to mental disorders among children who had received mental health care

Table 3 shows risk factors for disability pension among children who had received mental health care. For disability pension due to all mental disorders, father's upper secondary level education and basic level qualification decreased the risk for psychiatric disability pension. Father's psychiatric care and mother's psychiatric disability pension increased the risk. In the event of disability pension receipt due to schizophrenia, the male risk was 1.82-fold (95% CI 1.39–2.38) that of females. Parental divorce decreased the risk (OR 0.72, 95% CI 0.53–0.98), whereas parental receipt of social assistance increased the risk. Father's lower level education protected against disability pension receipt due to schizophrenia, while the father's psychiatric care increased the risk. For disability pension due to depressive and anxiety disorders, male sex was a risk factor, while the father's basic level qualification was a protective factor and the mother's psychiatric care increased the risk. There were no statistical significant risk factors for disability pension receipt due to other mental and behavioural disorders. However, the father's upper secondary level education compared to a tertiary level education decreased the likelihood of disability pension receipt due to other mental and behavioural disorders. Male sex was only a risk factor for disability pension receipt due to several psychiatric diagnoses.

Discussion

In this study childhood risk factors for later receipt of psychiatric disability pension before the age 25 years were examined. In the full 1987 cohort, of the determinants describing economic and social adversity in childhood, female-sex, parental divorce, and parental receipt of social assistance increased the risk of receiving psychiatric disability pension. Of the risk factors describing parental mental health problems, the mother's and father's psychiatric care and the mother's psychiatric disability pension receipt increased the risk of psychiatric disability pension. Among cohort members who had received mental health care, the father's upper secondary level education and basic level qualification protected from psychiatric disability pension compared to fathers' with a tertiary degree or higher level education. Father's psychiatric care and mother's psychiatric disability pension increased the risk. Mental health diagnosed children and adolescents are a vulnerable population group and they have greater risk of psychiatric disability pension receipt compared to the general population (Narusyte, Ropponen, Alexanderson & Svedberg, 2017). Further, the risk factors varied by the more specific diagnosis of disability pension. That indicates the importance of being more diagnosis-specific when studying risk factors for disability pension receipt. The reason for variation may be different kinds of aetiologies for mental disorders.

The knowledge is scarce when talking about family-related risk factors for psychiatric disability pension. First, the results of this study agree with the previous research literature concerning risk factors for disability pension receipt among young people. Sex has been found to have an effect on psychiatric disability pension (Gravseth et al., 2007), as was found in this study. It is already well known that sex affects different mental disorders in different ways, for instance, females have more depression and anxiety disorders (Albert et al., 2015), and ADHD is more commonly diagnosed in males (Hanson & Fine, 2012). Further, parental receipt of social assistance, which indicates financial hardship in the family, increased the risk for receipt of psychiatric disability pension. Harkko and colleagues (2016) have earlier reported that parental receipt of social assistance increases the likelihood of offspring's psychiatric disability pension receipt as well as somatic disability pension receipt in early adulthood (ages 19–28). Gravseth and colleagues (2007) have indicated in their follow-up study (ages 20–36) that parental disability pension receipt increases the offspring's risk of receiving a disability pension. This study confirmed these results, and also indicated that maternal and paternal disability pension has own effects to offspring's later psychiatric disability pension receipt. Second, this study indicated previously unreported risk factors for psychiatric disability pension receipt, such as parental divorce and

mother's and father's psychiatric care. However, those risk factors are reported to increase mental disorders among youth (Hancock et al., 2013; Lansford, 2009; Paananen et al., 2013).

In the mental health care population, children with highly educated fathers had an increased risk for psychiatric disability pension receipt. The results of our study suggest that higher educated parents may be able to better support their children with severe health concerns. Further, Paananen and colleagues (2013) discussed that children with an educated parent and better socioeconomic position might have better access to care. In Paananen's article and in the current study, mental disorders are based on the use of specialised care, and those cohort members who had not received care were omitted from the mental health care population. Gravseth and colleagues (2007) found that parental high educational level increased on the risk for disability pension receipt, but only in the low educated male offspring. Further, Lindblom and colleagues (2017) found that the authoritarian family type (a relative lack of intimacy combined with an average level of autonomy) predicted children's depression and inefficient emotion regulation only in families with high parental education level. Timms (1998) has speculated that failure to live up to high parental expectations may be involved in this finding. However, further research is needed to investigate the role of parental education and the process of applying for disability pension, with a focus on the outcomes of disability pension applications.

The main strength of this study was the longitudinal follow-up data for a complete census of all children born in a single year, 1987. Other strengths were the high-quality register data and the long follow-up period from 2003 to 2012. A further strength was that we had access to information about disability pension diagnoses. Children aged 16 to 19 years will be granted a rehabilitation allowance for a young person before a disability pension decision if needed (Koskenvuo, Hytti & Autti-Rämö, 2011). After the allowance came into force, the number of young people retired with a disability started to decrease, until the effect of law evened out, and the number of young people with disability who were retired started to increase again (Koskenvuo, Hytti & Autti-Rämö, 2010; Koskenvuo et al., 2011). In 2003, the legal requirement was already familiar, while the rehabilitation allowance for young person was even possible for children born in 1987. According to the literature, the legal requirement for a rehabilitation allowance for a young person has postponed the claiming of a disability pension. However, the number of people retired with disability has not decreased (Koskenvuo et al., 2010; Koskenvuo et al., 2011). Although Finnish registers are exhaustive, there is information that is not found in the registers, such as separation following cohabitation. The follow-up period ended 31.12.2012, when the cohort members were aged 25 years. In spite of the long follow-up period from 2003 to 2012, young adults aged 25 years are still young in the labour market and thus disability allowances due to

mental disorders as well as somatic illnesses is likely to increase (Harkonmäki et al., 2009; Krausse, Lynch, Cohen, Goldberg & Salonen, 1997).

In this study, childhood social determinants were studied in association with psychiatric disability pension receipt. In the Finnish registers, there are other parental determinants like severe parental hospital-treated somatic illnesses, parental death, and single mother during the birth of cohort member, which should be considered in further studies. In future studies on the psychiatric disability pension receipt among young adolescent and adults, there is need to take into account cohort members' own determinants, such as success at school and degrees, as well as service use, such as cohort members' receipt of sickness allowances and parental disability pensions from the national pension scheme.

Using knowledge about this study's risk factors should help identify adolescents and young adults, in general population and especially the mental health care population, who are at greatest risk of receiving a psychiatric disability pension. Those who have had a mental health diagnosis are already wounded, and that's why they are a special population. There will always be seriously ill children and adolescents whose only option is to receive a disability pension. However, following a mental health diagnosis, it is not too late to prevent a reduction in work ability and thus avoid disability pension receipt. In social policy, attention should be given to actions to better support childhood circumstances and the welfare of families.

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Table 1. Distributions of disability pension groups and childhood determinants in both study population, in the full 1987 cohort and among those who had received mental health care in Finland in 2003–2012.

Determinant	The full 1987 cohort		The mental health care population	
	n	%	n	%
	58 739		9 599	
Disability pension group				
Group 1: Mental and behavioural disorders (F00–F99)[1,3]	837	100.0	805	100.0
Group 2: Schizophrenia disorders (F20–F29)[1,2,3]	229	27.4	228	28.3
Group 3: Depressive and anxienty disorders (F30–F48)[1,2,3]	388	46.4	365	45.3
Group 4: Other mental and behavioural disorders (F00–F19, F50–F69, F80–F99)[1,2,3]	89	10.6	82	10.2
Organic mental disorders (F00–F09)	1	0.1	1	0.1
Mental and behavioural disorders due to psychoactive substance use (F10–F19)	0	0.0	0	0.0
Behavioural syndromes associated with physiological disturbances and physical factors (F50–F59)	16	1.9	16	2.0
Disorders of adult personality and behavioural (F60–F69)	10	1.2	8	1.0
Disorders of psychological development (F80–F89)	54	6.5	27	3.4
Behavioural and emotional disorders + unspecified mental disorder (F90–F99)	8	1.0	6	0.7
Group 5: Several psychiatric diagnoses[1,3]	131	15.7	130	16.1
Sex				
Male*	30002	51.1	4371	45.5
Female	28737	48.9	5228	54.5
Determinants describing economic and social adversity in childhood				
Teenage motherhood				
No*	56863	96.8	9097	94.8
Yes	1876	3.2	502	5.2
Parental divore [5]				
No divorce*	45445	77.4	6602	68.8
Divorce	13294	22.6	2997	31.2
Parental social assistance [5]				
No*	37584	64.0	4731	49.3
Yes	21155	36.0	4868	50.7
Mother's education level				
Tertiary degree education or higher (3 to 4 years or more after upper secondary level education)*	9375	16.0	1320	13.8
Lowest level tertiary education (2 to 3 years after upper secondary level education)	13589	23.1	1926	20.1
Upper secondary level education (11–12 years in education)	26521	45.2	4380	45.6
Basic level qualification (up to 9 years in education)	9254	15.8	1973	20.6
Father's education level				
Tertiary degree education or higher (3 to 4 years or more after upper secondary level education)*	10646	18.1	1464	15.3
Lowest level tertiary education (2 to 3 years after upper secondary level education)	8107	13.8	1120	11.7
Upper secondary level education (11–12 years in education)	25493	43.4	4197	43.7
Basic level qualification (up to 9 years in education)	13703	23.3	2631	27.4
Father unknown	790	1.3	187	1.9
Determinants relating to parental mental health problems				
Mother's psychiatric care [5,6]				
No*	54859	93.4	8595	89.5
Yes	3880	6.6	1004	10.5
Father's psychiatric care [5,6]				
No*	55589	94.6	8757	91.2
Yes	3150	5.4	742	7.7
Mother's disability pension [5]				
No*	56623	96.4	9008	93.8
Somatic	1159	2.0	249	2.6
Psychiatric (and maybe somatic)	957	1.6	342	3.6
Father's disability pension [5]				
No*	55417	94.3	8861	92.3
Somatic	2145	3.7	434	4.5
Psychiatric (and maybe somatic)	1177	2.0	304	3.2

[1] with or without somatic diagnoses; [2]diagnoses are from same group; [3]children with intellectual disabilities (F70–F79) excluded; [4]children are allocated to one disability pension group only; [5]child under age 16; [6] in- or outpatient; * reference category in logistic regression analyses

Table 2. Adjusted odds ratios with 95% confidence intervals for childhood determinants for receipt of disability pension due to mental disorders in the full 1987 cohort in Finland in 2003–2012, n = 58,739.

	Group 1: Mental and behavioural disorders		Group 2: Schizophrenia disorders		Group 3 : Depressive and anxiety disorders		Group 4: Other mental and behavioural disorders		Group 5: Several psychiatric diagnoses	
	Adj. mod I[1]	Adj mod II[2]	Adj. mod I[1]	Adj mod II[2]	Adj. mod I[1]	Adj mod II[2]	Adj. mod I[1]	Adj mod II[2]	Adj. mod I[1]	Adj mod II[2]
Determinant	OR (95%CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95%CI)
Sex (reference: male)		**1.36** (1.19–1.56)		**0.69** (0.53–0.91)		**2.07** (1.68–2.56)				**1.74** (1.22–2.47)
Determinant describing economic and social adversity in childhood										
Teenage motherhood	**1.57** (1.15–2.16)		**1.10** (0.54–2.23)		**2.10** (1.40–3.16)	**1.69** (1.11–2.58)	**1.06** (0.33–3.45)		**1.20** (0.49–2.94)	
Parental divorce[3]	**1.56** (1.34–1.80)	**1.20** (1.02–1.40)	**1.28** (0.95–1.71)		**1.72** (1.39–2.13)	**1.39** (1.11–1.74)	**1.26** (0.79–2.02)		**1.78** (1.24–2.56)	**1.62** (1.12–2.34)
Parental social assistance[3]	**1.89** (1.64–2.16)	**1.58** (1.36–1.83)	**2.39** (1.84–3.10)	**2.05** (1.56–2.69)	**1.80** (1.47–2.20)	**1.43** (1.14–1.80)	**1.52** (1.00–2.31)		**1.60** (1.13–2.25)	
Mother's education level	**1.00**		**1.00**		**1.00**	**1.00**	**1.00**		**1.00**	
Lowest level tertiary education (2 to 3 years after upper secondary level education)	**0.89** (0.71–1.12)		**1.20** (0.76–1.88)		**0.64** (0.46–0.89)	**0.61** (0.44–0.85)	**2.24** (1.02–4.96)		**0.81** (0.46–1.41)	
Upper secondary level education (11–12 years in education)	**0.97** (0.80–1.19)		**1.15** (0.77–1.74)		**0.86** (0.66–1.14)	**0.73** (0.55–0.97)	**1.72** (0.81–3.69)		**0.82** (0.50–1.33)	
Basic level qualification (up to 9 years in education)	**1.27** (1.01–1.60)		**1.66** (1.05–2.62)		**1.03** (0.74–1.42)	**0.74** (0.53–1.05)	**2.03** (0.87–4.74)		**1.23** (0.71–2.14)	
Father's education level	**1.00**		**1.00**		**1.00**		**1.00**		**1.00**	
Lowest level tertiary education (2 to 3 years after upper secondary level education)	**0.95** (0.74–1.21)		**0.97** (0.61–1.54)		**0.86** (0.59–1.24)		**0.92** (0.46–1.82)		**1.25** (0.68–2.31)	
Upper secondary level education (11–12 years in education)	**0.96** (0.80–1.17)		**0.91** (0.63–1.32)		**1.06** (0.81–1.40)		**0.58** (0.33–1.04)		**1.09** (0.66–1.81)	
Basic level qualification (up to 9 years in education)	**0.99** (0.80–1.22)		**1.04** (0.69–1.55)		**0.88** (0.64–1.21)		**0.97** (0.54–1.75)		**1.26** (0.73–2.17)	
Father unknown	**1.31** (0.77–2.23)		**2.59** (1.21–5.53)		**0.74** (0.27–2.04)		**1.35** (0.32–5.78)		**0.64** (0.09–4.76)	
Determinants relating to parental mental health problems										
Mother's psychiatric care[3]	**1.92** (1.56–2.38)	**1.40** (1.11–1.77)	**2.25** (1.54–3.29)	**1.53** (1.01–2.34)	**2.01** (1.49–2.72)	**1.50** (1.08–2.08)	**1.02** (0.45–2.35)		**1.67** (0.96–2.90)	
Father's psychiatric care[3]	**2.34** (1.89–2.90)	**1.80** (1.44–2.25)	**2.91** (2.00–4.23)	**2.13** (1.45–3.14)	**1.96** (1.40–2.73)	**1.47** (1.04–2.07)	**2.24** (1.16–4.33)	**2.24** (1.16–4.33)	**2.44** (1.44–4.11)	**2.07** (1.21–3.53)
Mother's disability pension[3]	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**		**1.00**	**1.00**
Somatic disability pension	**1.47** (0.97–2.23)	**1.28** (0.84–1.95)	**0.93** (0.34–2.49)	**0.77** (0.28–2.07)	**1.95** (1.14–3.33)	**1.76** (1.03–3.03)	**1.18** (0.29–4.80)		**1.20** (0.38–3.79)	**1.13** (0.36–3.57)
Psychiatric disability pension	**3.50** (2.56–4.77)	**2.26** (1.61–3.18)	**3.97** (2.30–6.85)	**2.25** (1.23–4.12)	**3.40** (2.15–5.36)	**2.23** (1.36–3.68)	**2.86** (1.05–7.81)		**2.92** (1.28–6.65)	**2.49** (1.09–5.70)
Father's disability pension[3]	**1.00**		**1.00**		**1.00**		**1.00**		**1.00**	
Somatic disability pension	**1.55** (1.14–2.10)		**1.51** (0.84–2.71)		**1.55** (1.00–2.41)		**1.60** (0.65–3.94)		**1.53** (0.71–3.29)	
Psychiatric disability pension	**2.30** (1.64–3.23)		**2.51** (1.36–4.61)		**2.20** (1.33–3.65)		**1.74** (0.55–5.53)		**2.43** (1.07–5.54)	

OR, odds ratio; CI, confidence interval; [1]Adjusted by sex;[2] Adjusted sex and other childhood determinants. Only statistical significant determinants shown;[3] child under age 16

Table 3. Adjusted odds ratios with 95% confidence intervals for childhood determinants for receipt of disability pension due to mental disorders among those who had received mental health care in Finland in 2003–2012, n = 9,599.

	Group 1: Mental and behavioural disorders		Group 2: Schizophrenia disorders		Group 3 : Depressive and anxiety disorders		Group 4: Other mental and behavioural disorders		Group 5: Several psychiatric diagnoses	
	Adj. mod I[1]	Adj mod II[2]	Adj. mod I[1]	Adj mod II[2]	Adj. mod I[1]	Adj mod II[2]	Adj. mod I[1]	Adj mod II[2]	Adj. mod I[1]	Adj mod II[2]
Determinant	OR (95%CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95%CI)
Sex (reference: male)				**0.55** (0.42–0.72)		**1.77** (1.42–2.21)				**1.44** (1.00–2.05)
Determinant describing economic and social adversity in childhood										
Teenage motherhood	**0.92** (0.66–1.28)		**0.64** (0.32–1.31)		**1.31** (0.85–2.00)		**0.45** (0.11–1.83)		**0.73** (0.30–1.79)	
Parental divorce[3]	**0.99** (0.85–1.16)		**0.82** (0.61–1.10)	**0.72** (0.53–0.98)	**1.14** (0.91–1.42)		**0.71** (0.43–1.18)		**1.13** (0.78–1.63)	
Parental social assistance[3]	**1.01** (0.88–1.17)		**1.23** (0.98–1.67)	**1.45** (1.07–1.95)	**1.00** (0.81–1.23)		**0.72** (0.46–1.11)		**0.87** (0.61–1.22)	
Mother's education level	**1.00**		**1.00**		**1.00**		**1.00**		**1.00**	
Lowest level tertiary education	**0.87**		**1.21**		**0.62**		**2.26**		**0.77**	
(2 to 3 years after upper secondary level education)	(0.69–1.10)		(0.77–1.90)		(0.44–0.87)		(1.02–4.97)		(0.44–1.35)	
Upper secondary level education	**0.80**		**0.98**		**0.71**		**1.32**		**0.69**	
(11–12 years in education)	(0.64–0.98)		(0.65–1.48)		(0.53–0.95)		(0.61–2.85)		(0.42–1.14)	
Basic level qualification	**0.79**		**1.07**		**0.65**		**1.09**		**0.82**	
(up to 9 years in education)	(0.62–1.01)		(0.67–1.69)		(0.46–0.92)		(0.45–2.63)		(0.47–1.42)	
Father's education level	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	
Lowest level tertiary education	**0.92**	**0.92**	**0.99**	**0.95**	**0.80**	**0.80**	**0.92**	**0.91**	**1.23**	
(2 to 3 years after upper secondary level education)	(0.71–1.20)	(0.71–1.19)	(0.62–1.58)	(0.59–1.52)	(0.54–1.19)	(0.54–1.18)	(0.46–1.84)	(0.46–1.82)	(0.67–2.29)	
Upper secondary level education	**0.78**	**0.46**	**0.76**	**0.66**	**0.88**	**0.88**	**0.43**	**0.43**	**0.90**	
(11–12 years in education)	(0.64–0.95)	(0.62–0.93)	(0.52–1.10)	(0.45–0.97)	(0.66–1.18)	(0.66–1.17)	(0.24–0.78)	(0.24–0.78)	(0.54–1.49)	
Basic level qualification	**0.67**	**0.64**	**0.72**	**0.60**	**0.62**	**0.61**	**0.58**	**0.58**	**0.90**	
(up to 9 years in education)	(0.53–0.83)	(0.51–0.80)	(0.48–1.08)	(0.40–0.92)	(0.45–0.87)	(0.44–0.85)	(0.31–1.07)	(0.31–1.08)	(0.52–1.56)	
Father unknown	**0.76**	**0.76**	**1.52**	**1.15**	**0.45**	**0.43**	**0.78**	**0.78**	**0.37**	
	(0.44–1.32)	(0.44–1.32)	(0.70–3.30)	(0.52–2.58)	(0.16–1.24)	(0.16–1.20)	(0.18–3.37)	(0.18–3.37)	(0.05–2.76)	
Determinants relating to parental mental health problems										
Mother's psychiatric care[3]	**1.24** (1.00–1.55)		**1.34** (0.91–1.97)		**1.36** (1.00–1.86)	**1.41** (1.04–1.92)	**0.67** (0.29–1.54)		**1.04** (0.60–1.82)	
Father's psychiatric care[3]	**1.39** (1.10–1.75)	**1.43** (1.13–1.80)	**1.71** (1.17–2.51)	**1.76** (1.19–2.62)	**1.12** (1.78–1.60)		**1.28** (0.64–2.57)		**1.48** (0.87–2.51)	
Mother's disability pension[3]	**1.00**	**1.00**	**1.00**		**1.00**		**1.00**		**1.00**	
Somatic disability pension	**1.03**	**1.06**	**0.68**		**1.32**		**0.95**		**0.90**	
	(0.65–1.62)	(0.68–1.68)	(0.25–1.86)		(0.73–2.38)		(0.23–3.90)		(0.28–2.84)	
Psychiatric disability pension	**1.61**	**1.63**	**1.78**		**1.54**		**1.39**		**1.32**	
	(1.16–2.23)	(1.17–2.26)	(1.02–3.09)		(0.96–2.48)		(0.50–3.81)		(0.58–3.01)	
Father's disability pension[3]	**1.00**		**1.00**		**1.00**		**1.00**		**1.00**	
Somatic disability pension	**1.23**		**1.18**		**1.20**		**1.34**		**1.24**	
	(0.89–1.70)		(0.66–2.14)		(0.75–1.92)		(0.54–3.33)		(0.57–2.67)	
Psychiatric disability pension	**1.37**		**1.55**		**1.37**		**0.38**		**1.53**	
	(0.94–1.98)		(0.83–2.87)		(0.81–2.33)		(0.05–2.73)		(0.67–3.50)	

OR, odds ratio; CI, confidence interval; [1]Adjusted by sex;[2] Adjusted sex and other childhood determinants. Only statistical significant determinants shown;[3] child under age 16