

## Disability pensions in individuals diagnosed with a developmental language disorder as children

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Knowledge is limited regarding the association between developmental language disorder (DLD) and disability pension. The objective of this cross-sectional study was to estimate the prevalence and grounds for granting disability pensions in a group of individuals diagnosed with a DLD as children. Four-hundred and sixty-nine individuals with a DLD (consecutively assessed in the same clinic during a period of 10 years) and 2345 controls from the general population were screened through the nationwide Danish Register of Disability Pensions, covering a study period of 11 years. The results show that individuals with DLD had significantly higher rates of disability pensions granted compared with the control group: 11.3% versus 2% ( $p < 0.0001$ ; odds ratio = 6.2; 95% confidence interval: 4.15–9.35). Mental disorder was the most frequent reason given for granting a disability pension and accounted for 86.8% of cases in the DLD group and 72.3% in the comparison group. The variable degree of expressive language disorder was related to the relative risk of being granted a disability pension, with the highest level apparent in the mild scoring group at assessment in childhood. Our results show that a diagnosis of DLD in childhood constitutes a strong predictor of disability pension in early adult life, thus emphasizing an urgent need for more knowledge about individual and contextual risk factors.

**Keywords:** developmental language disorders; disability pension; mental disorder; risk factors

### Introduction

Speech and language disorders are common developmental problems in childhood. The term developmental language disorder (DLD) refers to a predominance of language problems, excluding hearing loss, mental retardation, obvious neurological disorders, autism and orofacial abnormalities (World Health Organization (WHO) 1992). The prevalence of severe DLD in preschool children has been estimated at 2% (Westerlund and Sundelin 2000). For some of these children their early difficulties with communication disappear with increasing age, but for others the problems continue into adulthood. Since modern society depends heavily on language and literacy skills, persistent impairment is often accompanied by wider problems in educational, social and emotional development in later life (Cohen 2002).

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In a survey of historical and contemporary governmental data in the industrialized countries concerning work-force distribution and the prevalence of disorders of hearing, voice, speech and language Ruben (2000) estimated that communication skills are crucial for a third of all kinds of employment nationwide and up to 85% for urban jobs. In addition, the same author concluded that individuals impaired in communication are 42% more likely to become unemployed.

As far as social difficulties are concerned, few research data are available on adult outcomes. To our knowledge, only one study, conducted in the UK, has examined the long-term social outcomes associated with DLD. Clegg et al. (2005) found that out of 17 men with a severe receptive DLD, almost two-thirds had experienced prolonged periods of unemployment by their mid-thirties. Employment histories were unstable, and three had never been in paid employment. Owing to employment difficulties, a high proportion received welfare benefits. Independent living was another area of difficulty. Altogether these men were very impoverished, many lacking significant social relationships.

Terms like disability pensions, or ill-health retirement are all used to describe the specific kind of security programmes that support those individuals who, due to long-term disabilities cannot support themselves through work.

In the Scandinavian welfare states, including Denmark, reduced or lost ability to work is compensated by the benefit of disability pensions. Besides being a major health problem and economic challenge for the welfare state, disability pension has large social and economic consequences for the individual. People receiving disability pension, irrespective of cause, may experience financial hardship (Månsson et al. 1998), are likely to become socially isolated (Kaprio et al. 1996), and generally enjoy a poorer quality of life, although some do feel that receiving a disability pension improved their quality of life (Eden et al. 1998). Disability pensioners also have a high mortality rate (Karlsson et al. 2007). In the current study we have used disability pension as a crude indicator of work disability. To our knowledge, no published studies have so far examined to what extent people diagnosed with a DLD as children have subsequently received a disability pension, or which factors affect this association.

In the present report, results are reported from a cross sectional study comparing rates and grounds for disability pensions in a group of 469 individuals diagnosed with DLD as children, and 2345 controls from the general population using data from the nationwide Danish Register of Disability Pensions covering a study period of 11 years (1995–2006).

## **Subjects and methods**

### ***Study population***

In Denmark, children are eligible for referral to a local speech and language therapist, a service covered by the National Health Insurance. The present study encompassed 469 out of the 472 children who were assessed at The Speech and Hearing Institute in Copenhagen between 1970 and 1980. The majority of the children lived in Copenhagen County. At that time The Speech and Hearing Institute specialized in the assessment and treatment of children with DLD, following a preliminary evaluation by a local speech and language therapist. As a general rule, children were only accepted for assessment and treatment if their primary handicap was linguistic. Hearing-impaired

children, and children with obvious learning disabilities or psychiatric disorders were referred elsewhere. In three cases it was impossible to detect the full personal identification number, and these cases had to be excluded.

### ***Assessment methods***

The data collection included three weeks of observation in a kindergarten group, including a comprehensive linguistic assessment. Pure tone audiometry screening in the speech frequencies (250–4000Hz) was done to ensure that children were not hearing-impaired. Each child was administered a number of tests to measure areas typically assessed by speech and language therapists. To ensure a homogeneous assessment, only two speech therapists were involved. The second author (K-M.H.) assessed 245 children. The linguistic ability of the children was evaluated using formal tests covering the following areas of linguistic function:

*Area 1* – vocabulary, using ‘Language test 1’ (Ege 1967). The child was asked to name a series of pictures presented one-by-one in a booklet.

*Area 2* – phonology, using the ‘Phonology picture test’ (Kristensen and Kristensen 1972). This was a phonological test where the child was asked to name 80 pictures (preferably spontaneously). The test allowed recordings of the child’s pronunciation of vowels and consonants and groups of consonants in the beginning as well as in the middle and the end of the words.

*Area 3* – syntax and morphology. The child’s expressive syntax and morphology was scored on an ordinal scale based on their spontaneous speech when talking about pictures in a book. Where possible, the evaluation was based on a tape recording of the child’s ‘reading’. The performance of the child was classified as follows: (1) babbling, sounds, single words; (2) primitive sentences of up to three words; (3) sentences longer than three words but with severe grammatical deficiencies; (4) sentences with minor grammatical deficiencies; and (5) normal sentences for the age.

*Area 4* – memory span for sentences. The child was asked to repeat sentences of increasing length starting with two syllables. The memory span was assessed from this performance. During the study period, the Epstein test (Epstein 1962) was replaced by the auditory memory sub-test from the Wechsler Pre-School and Primary Scale of Intelligence (Wechsler 1967).

Intelligence quotient (IQ) was evaluated using formal psychometric assessment in 324 of 329 boys and in all of the 140 girls and was performed by one senior child psychologist. IQ was estimated according to the functioning on the Leiter scale (Leiter and Arthur 1955), and recorded as a categorical score. All observations and assessments were systematically recorded. This comprehensive report provided the basis for further education and treatment of the child.

A previous study (Hauschild, Mouridsen, and Nielsen 2005) included a review of the case records from The Speech and Hearing Institute to classify the types of linguistic problems according to the International Classification of Diseases (ICD-10) criteria (WHO 1992). In addition, an overall severity scale was added: no impairment; mild impairment; moderate impairment; and severe impairment. The speech and language pathologists applied this severity scale as a tool. The characteristics of the case group at assessment in childhood are displayed in Table 1.

Table 1. Characteristics of 469 language disordered children at assessment in childhood.

	Male	Female
Number	329	140
Mean age in years	5.5	5.7
Range (years)	2.9–11.8	3.8–8.9
<b>Expressive language disorder (F80.1)</b>	329	140
No impairment	0	0
Mild impairment	17 (5.2)	7 (5.0)
Moderate	59 (17.9)	39 (27.9)
Severe impairment	253 (76.9)	94 (67.1)
<b>Receptive language disorder (F80.2)</b>	257	121
No impairment	72	19
Mild impairment	92 (35.8)	35 (28.9)
Moderate	82 (31.9)	40 (33.1)
Severe impairment	82 (31.9)	46 (38.0)
Unknown	1 (0.4)	0 (0.0)
<b>IQ</b>		
50–69	34 (10.3)	20 (14.3)
70–84	86 (26.1)	49 (35.0)
85–115	193 (58.7)	69 (49.3)
>115	11 (3.3)	2 (1.4)
Unknown	5 (1.5)	0 (0.0)

Note: Values in parentheses are percentages.

### ***Control group***

A comparison group was drawn from the Central Persons Register (CPR). This register was established on 2 April 1968, when all persons alive and living in Denmark were registered. From that time, all persons who took permanent residence in Denmark were registered on the CPR, including every live born baby and every new inhabitant (Pedersen et al. 2006). All persons registered on the CPR are assigned a unique identification number, called the CPR-number, which is used in all national registers, enabling accurate linkage between all national registers. Each language-disordered child was matched with five control children by sex, time of birth (born on the same day), and place of birth (Copenhagen County). The control group comprised 2345 children.

### ***Education***

In Denmark, primary and secondary levels of education are integrated into one educational system. Most children start school when they are six years old, the first year being lead by a kindergarten teacher. Children then continue for nine years at the same school, taught by schoolmasters. The tenth year of school is voluntary. After passing the tests at the end of nine compulsory years of school, children may enter either vocational training or upper secondary school (Gymnasium) (age 16–19 years), possibly followed by a tertiary education at university. Since 1970, great efforts have been undertaken to integrate disabled children into mainstream schools. At present around 3% of the birth cohort are educated in special classes. Such classes

are held in small specialist classrooms, usually affiliated to mainstream schools, with a high staff:child ratio and regular intensive speech therapy. Specialist teachers are provided for children with complex and persisting language disorders.

In 1987–1988, all 245 participants who were assessed by K-M.H. in the 1970s were invited to participate in a follow-up study. Among the 155 persons (mean age=19 years) who agreed to participate in the follow-up study, 56% had spent their school hours in specialist classrooms, 38% had attended primary schools with support and 6% had passed primary school without any support. At the time of follow-up study 55 persons were 18 years or older. 24% had been granted a disability pension or worked in sheltered employment (Hauschild and Elbro 1992).

### ***Data on disability pensions***

All participants were screened through the computerized nationwide Danish Register of Disability Pensions (which uses the citizen's identity number and thus ensures a definitive identification) for the years 1995 up to and including 2005. The register includes data from 1 January 1995 onward and records the date of an application for a disability benefit, the date the benefit was granted, and on what grounds (diagnoses). Since 1 January 2003 there has been only one level of disability benefit. For the current analyses disability pension was dichotomized according to whether a pension or no pension had been granted.

The Register of Disability Pensions categorizes the grounds for an application according to a nomenclature, which derives from the ICD-10 International Classification of Mental and Behavioural Disorders (WHO 1992). One main diagnosis, and sometimes contributory diagnoses, are given as grounds for the decision. In this study we have based our analyses on main diagnoses only.

Disability pension is in Denmark granted by the municipal authorities to people employed in both the public and private sector. It is paid by the state and is independent of any private insurance that the person may have. A person is eligible for disability pension when he or she is between 18 and 65 years-old and has lived permanently in Denmark for more than 10 years during this time. At least five of these 10 years must be immediately before the disability pensioning. The municipal authorities grant disability pension based on assessment of somatic and mental health and work ability. A specialist in the relevant field makes the assessment of somatic or mental disability. Disability pension in Denmark must have a medical condition as the main cause, thus excluding primary social causes. All disability pension grants are made only when all possibilities of resumption of full working capacity have been explored and exhausted, or could be ruled out immediately, and where the disability is expected to be permanent, usually as result of severe medical conditions (congenital or acquired). The individual's work ability has to be permanently reduced to such a degree that returning to full work is unlikely. For these reasons, once awarded, disability pensions are very rarely withdrawn, despite mandatory reviews, usually at intervals of several years. The recipient is allowed to work part-time or in a sheltered workshop while receiving disability pension, and also to return to work later. However, these options are rarely used, and in reality being awarded a disability pension nearly always represents a permanent exit from the labour market in Denmark (Rasmussen and Nielsen 2003). It should be emphasized that there are several other forms of social support and benefit in cases when

disabilities are expected to be of a time-limited duration (Hjøllund, Larsen, and Andersen 2007).

In 2008 the early disability pension roughly corresponds to €24,000 for a single person and €21,000 for a married person. In 2007 the average yearly income roughly corresponded to €35,000 for a Danish taxpayer (Danish Bureau of Statistics 2008). However, the variation is considerable.

Both DLD cases and controls were studied from 1 January 1995 to 31 December 2005, which means a total study period of 11 years. Mean age of participants when they entered the study was 25.7 years (range: 18.2–36.6), at the end of the study period 36.7 years (range: 29.2–47.6) for both groups. In these calculations, we assume that no participants had died or emigrated at the end point of study.

### ***Statistical analysis***

Comparisons between groups were based on Pearson's Chi-Square Test or Fisher's Exact Test as appropriate. An unweighted logistic regression analysis was used to identify possible variables at assessment in childhood (level of IQ, degree of receptive and expressive language disorder) associated with being granted a disability pension during the period of observation. A level of  $p < 0.05$  (two-tailed test) was used to indicate significant differences between groups.

### ***Ethics***

The Danish Data Inspectorate approved the study protocol.

## **Results**

### ***Prevalence and grounds for granting disability pension***

Details of prevalence and grounds for granting disability pensions are given in Table 2.

At the end of the study period at least 53 persons (11.3%) in the DLD group and 47 (2.0%) in the control group were granted a disability pension. The difference was found to be highly significant (Pearson's Chi-Square 98.55;  $p < 0.0001$ ; odds ratio=6.2; 95% confidence interval: 4.15–9.35).

In both the DLD cases and the controls, mental disorders were the most frequent grounds for granting a disability pension, accounting for 46/53 (86.8%) of cases in the DLD group and 34/47 (72.3%) of cases in the control group. Mental disorders and central nervous system disorders altogether accounted for 50/53 (94.3%) of cases in the DLD group and 37/47 (78.7%) in the control group.

### ***Risk factors***

The prevalence of disability pension in relation to gender, IQ, presence of receptive language disorder and degree of receptive and expressive language are presented in Table 3.

Degree of expressive language disorder ( $p = 0.005$ ) was significantly related to the relative risk of having been granted a disability pension, with the highest level apparent in the mild scoring group. We found a generally higher prevalence of

Table 2. Prevalence and recorded grounds for granting disability pension to 469 individuals diagnosed with a developmental language disorder (DLD) as children versus 2345 controls from the general population. Data are presented as *n* (%).

	DLD ( <i>n</i> = 469)	Controls ( <i>n</i> = 2345)	<i>p</i>
<b>Number with pension</b>	53 (11.3)	47 (2.0)	<0.0001
<b>Pension grounds (ICD-10 category)</b>			
Malignant neoplasms	0 (0.0)	1 (0.04)	0.66
Endocrine, nutritional and metabolic diseases	0 (0.0)	1 (0.04)	0.66
Mental disorders	46 (9.8)	34 (1.5)	<0.0001
Diseases of the nervous system and sense organs	4 (0.9)	3 (0.1)	0.004
Diseases of the circulatory system	0 (0.0)	1 (0.04)	0.66
Diseases of the respiratory system	1 (0.2)	0 (0.0)	0.03
Diseases of the digestive system	0 (0.0)	1 (0.04)	0.66
Diseases of the skin and subcutaneous tissue	0 (0.0)	1 (0.04)	0.66
Diseases of the musculoskeletal system	0 (0.0)	2 (0.09)	0.53
Diseases of the genitourinary system	1 (0.2)	1 (0.04)	0.21
Injury and poisoning	0 (0.0)	2 (0.09)	0.53
Unknown	1 (0.2)	0 (0.0)	0.03

disability pension being granted to women compared with men, especially in the DLD group; 14.2% vs. 10.0% respectively. In the control group the respective figures were 2.1% vs. 2.0%. However, the differences were not statistically significant ( $p = 0.18$ , and  $p = 0.76$ , respectively). Likewise, presence of a receptive language disorder ( $p = 0.11$ ), degree of receptive language disorder ( $p = 0.12$ ), and level of IQ ( $p = 0.34$ ) were also not significantly associated with being granted a disability pension during the period of observation.

## Discussion

### *Disability pension rates*

Clegg et al. (2005) have published a study describing long-term psychosocial outcomes in 17 boys with a severe receptive DLD and a control group of non-affected siblings and also an IQ-matched population control group. Contrary to their expectations they found that just over one in six of the DLD group had been continually in paid employment, as compared with 94% of their siblings. Moreover, one in six had never had paid employment, this applying to none of either of the two control groups.

Our study comprises a much larger sample, with disability pension as a crude indicator of work disability. We found that individuals diagnosed in childhood with DLD, now on average in their mid-thirties, had a highly significantly elevated rate of disability pension grants as compared with a control group from the general population, 11.3% vs. 2.0% ( $p < 0.0001$ ). This result emphasizes that a diagnosis of DLD in childhood constitutes a strong predictor of disability pension in early adult life.

Table 3. Prevalence of disability pension as a function of gender, intelligence, presence of a receptive language disorder and degree of receptive and expressive language disorder in 469 individuals diagnosed with a developmental language disorder (DLD) as children versus 2345 controls from the general population. Data presented as *n*/group total (%).

	Disability pension	
	DLD	Controls
<b>Gender</b>		
Male	33/329 (10.0)	32/1645 (2.0)
Female	20/140 (14.2)	15/700 (2.1)
<b>Intellectual level</b>		
50–69	5/54 (9.3)	
70–84	12/135 (8.9)	
85–115	35/262 (13.4)	
>115	0/13 (0.0)	
Unknown	1/5 (20.0)	
<b>Presence of a receptive language disorder</b>	47/378 (12.4)	
<b>Degree of receptive language disorder</b>		
No impairment	6/91 (6.6)	
Mild impairment	14/127 (11.0)	
Moderate impairment	18/122 (14.8)	
Severe impairment	14/128 (10.9)	
Unknown	1/1 (100.0)	
<b>Degree of expressive language disorder*</b>		
Mild impairment	5/24 (20.8)	
Moderate impairment	16/98 (16.3)	
Severe impairment	32/347 (9.2)	

Note: \*The variable degree of expressive language disorder was significantly associated with being granted a disability pension ( $p=0.005$ ) during the period of observation.

There is no directly similar study with which to compare our findings. However, despite major methodological differences, the findings of the current study and the findings of Clegg et al. (2005) converge to show that there needs to be an increased awareness of the persisting social difficulties that many individuals with DLD experience. As documented in a recent review (Cohen 2002), many of these children do not outgrow their difficulties, and parents, education and health services need to be aware of the complex and continuous needs of these children and adults. More effective support can then be provided to prepare these children and their families for the demands of adult life.

### *Predictors of disability pensions in DLD*

The aetiology of disability pensions is of great public health interest as well as of economic interest. Even though it is difficult to know which stage is predicted in the complex process toward a disability pension, the knowledge of early risk factors is important in the design of educational programmes for people with DLD. In this study, we have included only a few individual risk factors, and we found no significant



relationship between gender or level of IQ, and the presence and degree of a receptive language disorder. Clegg et al. (2005) were also unable to find convincing risk factors in their study. Somewhat surprisingly, the language profile most commonly associated with disability pension was that of mild impairment of expressive language. The reason(s) for the rather unexpectedly high rate of disability pension in the mentioned group is(are) uncertain and could not be explained by inspection of the available information. However, due to the cross-sectional design of our study, we cannot rule out the possibility that many participants from the severe receptive language group, or some of those with a mild mental retardation may have been granted a disability pension before 1995, and in this way limiting our analysis of risk factors.

Unfortunately, the current study revealed no convincing associations with factors that may mediate being granted a disability pension, making it difficult to recommend how to address the problems. However, whatever factors are involved it is essential that from the earliest years children with DLD are offered every opportunity to develop their psychosocial, cognitive and linguistic abilities.

Our findings emphasize the need for better understanding of the complex mechanisms behind being granted a disability pension. Gravseth et al. (2007) identified low educational level as a major risk factor, but childhood factors also contribute, such as low birth weight, childhood disease, parents not being married and parental disability. A psychiatric diagnosis (Upmark et al. 1997) and low intellectual performance at conscript have also been found to be strong risk factors for a disability pension (Upmark et al. 2001).

### ***Methodological considerations***

The current study has unique advantages and some limitations. We studied a large group of children, and cases were matched to controls by age, gender and region of birth. It is a major advantage of this study that any bias due to subjective recall of life events was avoided, as all data were collected by routine, independently of the study. Furthermore, using register data gives a complete follow-up on all cases without the attrition that limits many 'personal' follow-up studies. The data in the Danish Register of Disability Pensions Register are considered to be complete and are collected systematically and independently of any specific research, which may reduce the risk of misclassification bias.

The study has also some limitations. An important limitation is that we have no valid information on decisions on disability pensions prior to the study period. We are informed anecdotally that some of those who are classified as not in receipt of a disability pension had already received a pension before the Danish Register of Disability Pensions was established in 1995 (Hauschild and Elbro 1992). Therefore, the study may underestimate the number of cases and controls who had been granted a disability pension at the end of the period of observation. It is also a limitation that the control group was not matched on IQ; neither do we have information whether this group contains participants with DLD difficulties. This should not be a serious problem, as there is little likelihood that a severely language disordered child in the region (Copenhagen County) would not have been discovered and then included in our case group (Hauschild, Mouridsen, and Nielsen 2005). Finally, it is important to note that this study in many ways was based on daily routines methods under

practice in the Speech and Hearing Institute throughout the 1970–1980 period, and our data were not specifically collected to record disability pensions.

In summary, paid work has a crucial impact on people's social and material well-being in terms of income, social status, influence, social relationships and personal identity. While disability pensions are primarily a way of granting economic security to physically and mentally handicapped individuals, they also may contribute to social isolation. Therefore, early disability pensions may have serious consequences for well-being. It is undoubtedly preferable to maintain an active employment for people with a DLD as long as possible. Danish legislation has recently been modified to encourage and further facilitate employment of disabled persons and to a greater extent to avoid complete withdrawal of such people from the labour market. If successful, this policy should result in a decline in the numbers of disability pensions.

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