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ORIGINAL ARTICLE

Behavioural problems of 8-year-old children with and without intellectual disability

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Abstract

The aim was to study the prevalence of behavioural and emotional problems among 8-year-old children with intellectual disability (ID) and to compare their results to those obtained among the general child population in the same cohort. In a prospective birth cohort study, parents filled in two questionnaires and teachers assessed children's behaviour using the Rutter scale (RB2). At the age of seven, the Northern Finland Birth cohort 1985/86 included 9357 children, of whom 106 had an intellectual disability. 44.4% of the children with ID and 14.1% of the children without ID showed probable psychiatric disturbances. In the group of children with ID, behavioural (20.8%) and emotional (18.1%) problems were almost equally common, and hyper-activity problems were frequent (36.1%), whereas in the group of children without ID, behavioural problems (9.1%) and hyperactivity (9.3%) were more common than emotional problems (4.9%). In both groups, boys had more problems than girls, even though the difference was not statistically significant among the children with ID. Over one third of the children with ID had additional disabilities, but these did not increase the risk of having behavioural problems. Because children's psychiatric disorders and behavioural problems are not only very distressing to them and their families but also have a negative impact on their learning at school, peer relationships and social competence, more attention should be paid to preventing them by educational and environmental interventions that support parents and teachers. (J Pediatr Neurol 2003; 1(1): 15-24).

Key words: behavioural problems, emotional problems, Rutter scale, intellectual disability, psychiatric disturbance, psychopathology.

Introduction

The prevalence of emotional and behavioural problems in children with intellectual disability (ID) is higher (30%-65%) (1-8) than that in the general child population (14%-25%) (9-15). Behavioural problems, such as aggressiveness and hyper-activity, emotional problems, including mood disorders, withdrawal and self-injury, as well as pervasive developmental problems, such as autism, stereotyped behaviour and disintegrative psychosis, are common among individuals with ID (4,16,17). However, the level of ID affects the type of behaviour in such a way that disruptive behavioural problems are more prominent in children with mild ID [Intelligence Quotient (IQ) 50-70], whereas self-absorbed, psychotic and autistic behaviours, self-injury and stereotyped mannerisms are more common in the group of children with severe ID (IQ < 50) (3,6,8,18).

In the general child population, psychiatric disturbances and behavioural problems are more common in boys than in girls (9,19-21), but in the group of children with ID, the results concerning gender differences are contradictory. Molteno et al. (8), for instance, indicated that boys had more psychiatric disturbances and behavioural problems than girls, but Einfeld and Tonge (6) reported thatage and sex did not affect the prevalence. Gillberg et al. (3) showed that, among children with mild ID,

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Table 1. Characteristics of the children with ID (n = 106) in the Northern Finland birth cohort 1985/86

Characteristics	n (%)
Gender	
Male	60 (56.6)
Female	46 (43.4)
Level of intellectual disability	
Profound (IQ < 20)	12 (11.4)
Severe (IQ 20-34)	7 (6.6)
Moderate (IQ 35-49)	17 (16.0)
Mild (IQ 50-70)	70 (66.0)
Cause of intellectual disability	
Prenatal	54 (50.9)
Paranatal	3 (2.8)
Postnatal	9 (8.5)
Unclassified	40 (37.8)
Additional disabilities	
Epilepsy	8 (7.5)
Epilepsy, visual impairment	2 (1.9)
Epilepsy, psychiatric problems	2 (1.9)
Cerebral palsy	5 (4.7)
Cerebral palsy, epilepsy	4 (3.8)
Cerebral palsy, visual impairment	1 (0.9)
Cerebral palsy, epilepsy, visual impairment	7 (6.6)
Cerebral palsy, epilepsy, hearing and visual impairment	1 (0.9)
Visual impairment	2 (1.9)
Visual impairment, psychiatric problems	1 (0.9)
Psychiatric problems	4 (3.8)

boys had more problems than girls (1.9:1), but the difference was not so clear in a group of children with severe ID (1.4:1).

The studies concerning the effects of additional disabilities on children's behaviour are also inconsistent. Gillberg et al. (3), Molteno et al. (8), and McQueen et al. (5) reported an increased risk of psychiatric disturbance in children with epilepsy. Jones and Cull (22) did not find significant differences between those with and without epilepsy when assessed by the ABS scale (adaptive behaviour scale), whereas by using the Rutter scale (Rutter behaviour scales), hyperactive behaviour was found to be more common in the group with epilepsy. According to McQueen et al. (5) and Molteno et al. (8), cerebral palsy did not increase the risk of psychiatric disturbances, but Goodman and Graham (18) showed an association between hemiplegia and psychiatric disorders. In the Northern Finland birth cohort 1985/86 (NFBC 1986), teachers assessed the behaviour of the 8-year-old children with and without ID. The aim of this study was 1) to examine the prevalence of probable psychiatric disturbances and emotional and behavioural problems among the children with ID stratified by the level of ID and gender, 2) to characterize the type of emotional and behavioural problems among the children with ID and 3) to compare the results to those obtained among the general child population in the same cohort. Furthermore, 4) we wanted to study the effects of additional disabilities on the behavioral problems of the children with ID.

Subjects and methods

Subjects

The group of children with ID is part of a comprehensive, total population-based prospective mother-child birth cohort collected from the two northernmost provinces of Finland (Oulu and Lapland). The cohort comprised 9432 live-born children (99% of eligible) whose expected date of birth was between July 1st, 1985 and June 30th, 1986 (23). At the age of seven, 99% of the children (n = 9357) were alive (21).

Data on children with potential ID were collected and reviewed up till 30.12.1996, using register data, hospital, family counselling and institutional records, psychometric tests results and parental questionnaires (24). At the end of the year 1996, when the children were 11.5 years old, the cohort included 105 children with ID (IQ < or = 70), but in the present study the number of the children with ID is 106, as one of the children died in the summer 1994 after our data collection. The characteristics of the children with ID are presented in Table 1.

Methods

Data collection was started before the children's birth and has been continued since the perinatal period. The following two-stage research was carried out when the children were aged seven and eight years. In the first stage, in the autumn of the children's first school year, information about their growth, development and health, school and family type and social situation was gathered from the parents using a postal questionnaire. In the second stage, seven months later, in the spring of the children's first school year, the teachers assessed the children's behaviour using the Children's Behaviour Questionnaire for Teachers (B2) by Rutter (25) and the parents filled in the questionnaire on children's psychomotor development and behaviour. The parents returned the postal questionnaire on background factors for 8416 children (90%) and the questionnaire on psychomotor development and behaviour for 8370 children (90%). The teachers' questionnaire (RB2) was returned for 8525 children (92%). For the children with ID, the teachers' response rate was 70% (n = 74).

Children's emotional and behavioural problems were assessed using information obtained from the teachers. The RB2 questionnaire includes 26 items, producing a total score from 0 to 52. Children with a total score of 9 or more were designated as indicating probable psychiatric disturbance (we used the term "probable psychiatric disturbance", because these children were not clinically diagnosed but screened by a validated questionnaire). Of these children; those with the emotional subscore (4 items, max score 8 points) higher than the behavioural subscore (6 items, max score 12 points) were designated as "children with emotional problems" and those with the behavioural subscore higher than the emotional subscore as "children with behavioural problems". The children with equal emotional and behavioural subscores were called the mixed group. A child with emotional, behavioural or mixed problems can be also classified as hyperactive because a child is defined as hyperactive if he or she gets 9 or more scores on the total scale and 3 or more on the hyperactivity items (3 items, max 6 points). In the analysis of the 26 items, if there were responses to 20 or more items, the missing items were replaced by the mean of the items responded by each subject. For the emotional, behavioural and hyperactivity subscores, the inclusion criterion was 3 out of 4, 5 out of 6 and 2 out of 3 items, respectively.

The variables that describe the changes in family type and in the family's place of residence during the seven years were based on the questionnaires filled in by the mothers during the pregnancy and the information obtained from the parents' postal questionnaire when the child was seven years old. The variable "family type" was divided into four subtypes: 1) **always two-parent family**, meaning that the child lived with his/her biological parents, and that the parents were married or cohabiting, 2) **single-parent family**, meaning that the child lived with his/her biological parent who had divorced, separated or been widowed, 3) **reconstructed family**, meaning that the child lived in a family where his/her biological parent had divorced, separated or been widowed, but now had a new spouse or partner or, in a family where the mother had been a single mother at the time of the child's birth, but had married or cohabited later either with the child's biological father or a step father, 4) **always one-parent family**, meaning that the child lived in a family where the mother had never been married or cohabiting. Information about the family's social status and the parents' education was obtained from the parents' postal questionnaire. The number of children in the family (sibship size) and the child's birth order were obtained from the parents' questionnaire on children's psychomotor development and behaviour.

Analyses

Numbers, proportions, odds ratios (OR) and their 95% confidence intervals (CI) were used to present the data and to show the associations. The SPSS for Windows (version 10.0) software package was used for statistical analyses.

In the study, the comparison group was composed of the cohort's children who had not been identified as intellectually disabled (IQ >70), and they were called children without ID in contrast to the children with ID.

Results

Social background of the children

Up till the age of seven, a majority of the children had always lived with their biological parents (Table 2). Family type had changed for 15.5% of the children with ID (n = 13) and for 13.3% of the children without ID (n = 1095). When the proportions of "always two-parent families" and the other family types were compared between the groups of children with and without ID, the difference was not statistically significant. Even though most of the children lived in families with 2-4 children, the number of very large families was considerable, and the children with ID lived more often in a large family than the children without ID (OR 2.8, 95% CI 1.7-4.6). 20% of the mothers of the children with ID (mean age 28.5 y, ranged 18-46 y) and, respectively, 13% of the mothers of the children without ID (mean age 27.8 y, ranged 15-50 y) were 35 years or over at the time of a child's birth (OR 1.6, 95% CI 1.0-2.7). Most of the families belonged to the third social class, but the families of the children with ID belonged nearly three times more commonly to the fourth social class than the families of the children without ID (OR 2.7, 95% CI 1.3-5.5). Half of the children with ID attended normal comprehensive school, even though 18% of them needed special arrangements (school assistants and/or accommodated curricula) to support their studying. Another half of the children attended a training school or some other special school, and some had started their school in the day care centre.

Children with probable psychiatric disturbances (Rutter > or = 9)

For the children with ID (n = 106), it was possible to calculate the scores from the teacher's scale (B2) for 72 children (68%). In 34 cases (32%), information was missing entirely or the responses were incomplete. Respectively, among the children without ID (n = 9251), the scores for the teacher's scale were obtained for 8410 children (91%). The comparison between the children with and

Table 2. The proportion of children with (n = 106) and without (n = 9251) intellectual disability (ID) by family type, sibship size, mother's age at the time of the child's birth, social status of the family and type of school at 7 years in the Northern Finland 1985-1986 birth cohort (alive at 7 years n = 9357)

Parameters	Children with ID n (%)	Children without ID n (%)	All n (%)
Family type at 7 years of age			
Always two-parent family	70 (83.3)	7043 (85.3)	7113 (85.3)
Single-parent family [a]	4 (4.8)	532 (6.4)	536 (6.4)
Reconstructed family [b]	9 (10.7)	563 (6.8)	572 (6.8)
Always one-parent family	1 (1.2)	121 (1.5)	122 (1.5)
Total	84 (100)	8259 (100)	8343 (100)
Sibship size			
1 child	8 (9.5)	652 (7.9)	660 (7.9)
2-4 children	49 (58.4)	6421 (77.8)	6470 (77.6)
5-19 children	27 (32.1)	1178 (14.3)	1205 (14.5)
Total	84 (100)	8251 (100)	8335 (100)
Mother's age at the time of the child's birth			
Mother's age ≤ 19 years	5 (4.7)	392 (4.2)	397 (4.2)
Mother's age 20-34	80 (75.5)	7653 (82.8)	7733 (82.7)
Mother's age 35 ≥	21 (19.8)	1206 (13.0)	1227 (13.1)
Total	106 (100)	9251 (100)	9357 (100)
Social status of the family at 7 years of age			
I-II (professional)	25 (30.9)	3317 (40.8)	3342 (40.7)
III (skilled worker)	33 (40.8)	3604 (44.3)	3637 (44.2)
IV (unskilled worker or no occupation)	10 (12.3)	406 (5.0)	416 (5.1)
Farmer	13 (16.0)	804 (9.9)	817 (10.0)
Total	81 (100)	8131 (100)	8212 (100)
Type of school at 7 years of age			
Comprehensive school	27 (32.6)	8190 (98.7)	8217 (98.1)
Adapted in the comprehensive school	5 (6.0)	19 (0.2)	24 (0.3)
Special class in the comprehensive school	10 (12.0)	14 (0.2)	24 (0.3)
Training school	25 (30.2)	3 (0)	28 (0.3)
School for severely disabled	7 (8.4)	0 (0)	7 (0.1)
School for visually impaired	1 (1.2)	0 (0)	1 (0)
School for hearing impaired	1 (1.2)	5 (0.1)	6 (0.1)
Other special school	1 (1.2)	6 (0.1)	7 (0.1)
Other [c]	6 (7.2)	58 (0.7)	64 (0.7)
Total	83 (100)	8295 (100)	8378 (100)

[a] Two-parent family at birth – single-parent family at 7 years.
[b] Two-parent family at birth – two-parent family at 7 years (non-biological parent) or single-parent family at birth – two-parent family at 7 years (either biological or non-biological father)
[c] Intellectually disabled children's star of school had been postponed and they got instruction at a day care center, for non-disabled children the school form was, for instance, Steiner school or a school abroad.

without ID indicated that the probable psychiatric disturbances were almost five times more common among the children with ID than among those without ID (OR 4.9, 95% CI 3.0-8.0) (Table 3).

The risk for boys with ID to have a probable psychiatric disturbance was 1.2-fold compared to that for girls, but the risk was not statistically significant, whereas in the comparison group, the risk for boys was 2.6-fold compared to that for girls (OR 2.6, 95% CI 2.3 - 3.0).

Emotional and behavioural problems and hyperactivity

All types of problems were more prominent among the children with ID than in the comparison group (Table 3). The numbers of behavioural (20.8%) and emotional (18.1%) problems seemed to be almost equal in the group of children with ID, whereas the children without ID had clearly more behavioural problems (9.1%) than emotional problems (4.0%). The risk for mixed-type problems (OR 5.6, 95% CI

Table 3. The numbers and proportions of the children with and without ID stratified by subcategories on the Rutter scale and gender in the Northern Finland birth cohort 1985/86

Children	Probable psychiatric disturbances n (%)	Behavioural problems n (%)	Emotional problems n (%)	Mixed problems n (%)	Hyperactive problems n (%)
Children with ID	32 (44.4)*	15 (20.8)*	13 (18.1)*	4 (5.6)*	26 (36.1)*
Boys (n = 45)	21 (46.7)	10 (22.2)	9 (20.0)	2 (4.4)	18 (40.0)
Girls (n = 27)	11 (40.7)	5 (18.5)	4 (14.8)	2 (7.4)	8 (29.6)
Children without ID	1184 (14.1)	762 (9.1)	334 (4.0)	88 (1.0)	782 (9.3)
Boys (n = 4294)	836 (19.5)	598 (13.9)	176 (4.1)	62 (1.4)	599 (13.9)
Girls (n = 4115)	348 (8.5)	164 (4.0)	158 (3.8)	26 (0.6)	183 (4.4)
Total	1216 (14.3)	777 (9.2)	347 (4.1)	92 (1.1)	808 (9.5)

Chi-square test calculated between the groups of the children with and without ID * P < or = 0.001

Table 4. The numbers and proportions as well as odds ratios (OR) with 95% confidence interval (CI) for the different items on the Rutter scale indicating behavioural and emotional problems and hyperactivity in the Northern Finland birth cohort 1985/86 (combined the statements "certainly applies" and "applies somewhat")

Parameters	**Children with ID (n = 72) n (%)**	**Children without ID (n = 8410) n (%)**	**OR**	**95% CI**
Behavioural problems				
Often destroys or damage own or others' property	16 (22.2)	475 (5.6)	4.79	2.62 - 8.66
Frequently fights or is extremely quarrelsome with other children	19 (26.0)	1596 (18.9)	1.51	0.86 - 2.62
Is often disobedient	31 (42.4)	1522 (18.1)	3.35	2.05 - 5.47
Often tell lies	9 (12.5)	701 (8.3)	1.57	0.72 - 3.29
Has stolen things on one or more occasions	6 (8.2)	197 (2.4)	3.73	1.44 - 9.08
Bullies other children	20 (27.4)	1403 (16.7)	1.89	1.09 - 3.25
Emotional problems				
Often worried, worries about many things	19 (26.4)	1936 (23.0)	1.20	0.69 - 2.09
Often appears miserable, unhappy, tearful or distressed	25 (34.9)	1190 (14.1)	3.23	1.92 - 5.39
Tends to be fearful or afraid of new things or new situations	41 (57.7)	1649 (19.6)	5.62	3.41 - 9.26
Has had tears on arrival at school or has refused to come into the building this year	8 (10.9)	296 (3.5)	3.38	1.49 - 7.36
Hyperactivity problems				
Very restless	44 (61.1)	2473 (29.4)	3.80	2.30 - 6.27
Squirmy, fidgety child	43 (58.1)	2112 (25.0)	4.15	2.55 - 6.78
Has poor concentration or short attention span	45 (61.6)	1761 (20.9)	6.09	3.70 - 10.05

1.9-16.3) and hyperactivity (OR 5.5, 3.3-9.2) was almost sixfold in the group of children with ID compared to the group of children without ID. As to the subscales (behavioural and emotional problems and hyperactivity), the difference between the boys and girls with ID was not statistically significant, but in the comparison group, the boys had a higher risk to have behavioural problems (OR 3.9, 95% CI 3.2-4.6) and to be hyperactive (OR 3.9, 95% CI 2.9-4.2) than the girls. Table 4 displays the children's problems as assessed by their teachers. Disobedience, bullying and destroying or damaging one's own or others' property seemed to be the most prominent behavioural problems at school among the children with ID. They also seemed to be fearful or afraid of new things, unhappy or distressed about many things, which were indicative of emotional problems, more often than the children in the comparison group. Hyperactivity appears to be strongly associated with intellectual disability. Restlessness, fidgeting, poor concentration and short attention span were characteristic of the behaviour of two thirds of the children with ID compared to one third or less of the children without ID.

Behavioural problems by the levels of ID and additional disabilities

Probable psychiatric disturbance, behavioural and emotional problems and hyperactivity were most common among the children with mild ID, and boys had most problems more often than girls (Figure 1). Only the number of behavioural problems was similar in both genders. Of all the children with ID, information concerning the additional disabilities was obtained from hospital and institutional records. 34.9% (37/106) of the children with ID had some additional disabilities, of which epilepsy and CP were the most common. As to the IQ levels, all the children with profound and severe ID (n = 19) and 5 of the 17 with moderate and 13 of the 70 with mild ID had additional disabilities (Table 5). Information regarding the teachers' assessments on children's behavioural problems (Rutter B2) was missing for 32 children with ID and for two children there were too many missing items for the use of the scale. Ten (29.4%) of the 34 children without Rutter B2 score had severe ID (IQ < 50) with additionaldisabilities, whereas only five (14.7%) with mild ID had additional disabilities. Respectively, 14 (19.4%) of the 72 children with Rutter B2 had severe ID with additional disabilities and, correspondingly eight (11.1%) with mild ID. The differences between the groups with and without Rutter B2 were not statistically significant, even though in the group of the children without Rutter B2, there were more children with additional disabilities (44.1% vs. 30.6%). The teachers' response rate was not either associated with the level of child's ID, even though proportionally the group of the children with severe ID was bigger among those whose teachers did not answered (41.2% vs. 30.6%).

Nine of the 32 children who exceeded the cut-off point on the Rutter (> or = 9) scale indicating probable psychiatric disturbances had additional disabilities. Even though the children with mild ID had most behavioural problems (Figure 1), only three had additional disability. The research showed that additional disabilities did not increase the risk of having behavioural problems among children with ID.

Discussion

The purpose of this research was to compare the behavioural problems of children with and without ID in a large birth cohort. There are only a few studies (1,7,14,15,26) where this study design has been used, especially in such a large child population as ours (n = 9357). The advantage of the longitudinal birth cohort study design is that it enables the use of all available information when tracing the explored cases. In this study, the children's IDs were reviewed by using register data, hospital, family counselling and institutional records, psychometric tests results and parental questionnaires from birth to 11.5 years of age, which guaranteed that all the children with ID were included (24). Teachers assessed the children's behaviour near the end of their first school year using the Children's Behaviour Questionnaire for teachers (B2) by Rutter (25). This scale has been developed for teachers to evaluate children's emotional and behavioural problems, and it is widely used and suitable for screening populations. The reliability of the scale has been reported to be high (25,27), and the scale has been used and validated in a series of population-based studies in Finland (7,10,13,28,29). Even though the Rutter scale does not include items that describe the behaviours typical of children with ID and especially ones with profound and severe disability (30), we used the same instrument for all the children due to the nature of the cohort study. The research showed that probable psychiatric disturbances were much more common in the children with ID (44.4%) than in the children without ID (14.1%). Our results fell within the range of 30% to 60% reported in the previous studies (2-4,6,8,14), even though comparison between studies is difficult due to the different operational definitions and instruments. However, the prevalence rate of psychiatric problems in our study was higher than in the studies of Rutter et al. (1) and Linna et al. (7), who used the same instrument.

The numbers of behavioural (20.8%) and emotional (18.1%) problems were almost equal in the group of children with ID, whereas the children

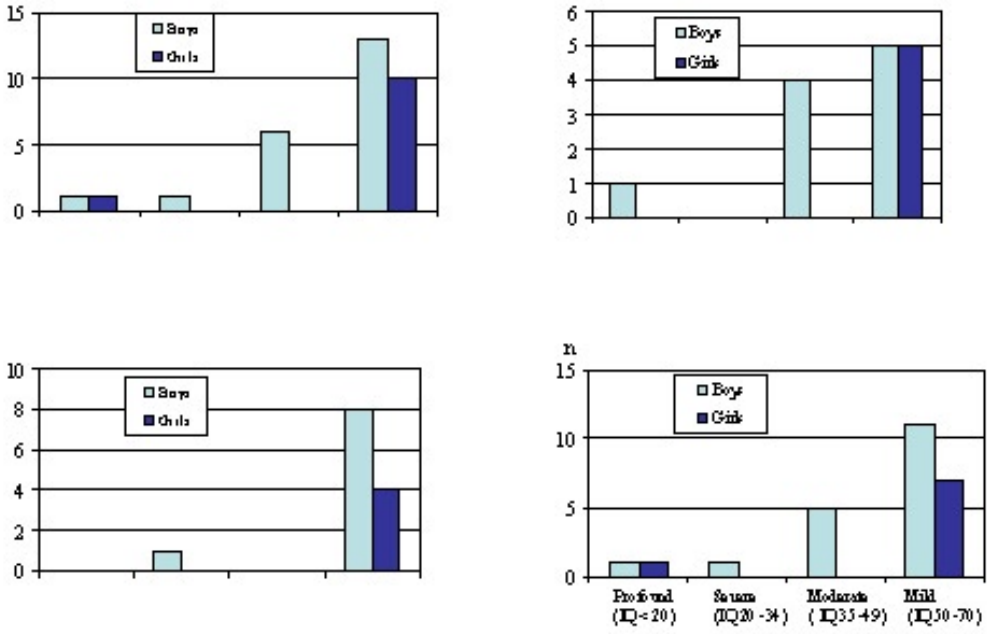

Figure 1. Children's behavioural problems stratified by the intelligence quotient (IQ) (n = 72).

Table 5. The number and proportion of the additional disabilities of the children with ID (n = 106) stratified by IQ level in the Northern Finland birth cohort 1985/1986. The numbers in the brackets indicate those with probable psychiatric disturbances (Rutter > or = 9; n = 9)

Additional disabilities	n	Profound (IQ < 20) (n = 12)	Severe (IQ 20-34) (n = 7)	Moderate (IQ 35-49) (n = 17)	Mild (IQ 50-70) (n = 70)
Epilepsy	8	1 (1)	3		4 (1)
Epilepsy, visual impairment	2			1	1 (1)
Epilepsy, psychiatric problems	2	1		1	
Cerebral palsy	5	1			4 (1)
Cerebral palsy, epilepsy	4	1	2 (1)	1 (1)	
Cerebral palsy, visual impairment	1	1			
Cerebral palsy, epilepsy, visual impairment	7	5 (1)			2
Cerebral palsy, epilepsy, hearing and visual impairment	1	1			
Visual impairment	2			1	1
Visual impairment, psychiatric problems	1		1		
Psychiatric problems	4	1 (1)	1	1 (1)	1
Total	37	12 (3)	7 (1)	5 (2)	13 (3)
%	34.9	100.0 (25.0)	100.0 (14.3)	29.4 (40.0)	18.6(23.1)

without ID had much more behavioural problems (9.1%) than emotional ones (4.0%). The risks for mixed-type problems and hyperactivity were almost sixfold in the group of children with ID than in the comparison group. As shown in the other studies, the risk for boys in the general child population (9,19-21) and boys with ID (2,8) to have behavioural problems is higher than that for girls. Our resultsare in line with these findings, even though the difference between the boys and girls with ID was not statistically significant. In the comparison group, however, boys had a nearly fourfold risk to have behavioural problems and to be hyperactive compared to girls. Hyperactivity appears to be strongly associated with intellectual disability (Table 4). Restlessness, fidgeting, poor concentration

and short attention span were typical behaviours of the children with ID. Similar results have also been reported by others (2,22).

When we examined the results stratified by the IQ level, the research showed that probable psychiatric disturbances, behavioural and emotional problems and hyperactivity were most common among the children with mild ID (Figure 1). Even though there are studies that support our findings (3,6,8), the result may also be due to the fact that the Rutter scale is suitable for assessing the behaviour of children with mild ID, but not for children with severe ID (IQ <50). According to Dekker et al. (14) the use of instruments not specifically designed to assess the behavioural problems of children with ID might underscore the problems of these children. The difficulty to use the Rutter scale was seen in the response rate. As many as 92% of the teachers of the children without ID but only 70% of the teachers of the children with ID returned the questionnaire. One probable reason for the low response rate for the children with ID may be that, concerning the children with severe ID, it was very difficult for the teachers to answer the questions. Proportionally the group of the children with severe ID was bigger among those whose teachers did not answer and they had more additional disabilities than those whose teachers had answered, even though the difference between the groups was not statistically significant. Self-absorbed, psychotic and autistic behaviours, self-injury and stereotyped manners are common among children with severe ID (3,6,8), but this kind of behaviour could not be assessed with this scale, which possibly affected the teachers' willingness for assessing the children's behaviour.

Over one third of all the children with ID and 67% of the children with severe ID (IQ <50) had some additional disabilities. In the group of children with mild ID, additional disabilities were seen in 19% of the cases. Epilepsy and cerebral palsy alone or combined with visual or hearing impairment and psychiatric problems were the most common additional disabilities. In our study group the additional disabilities did not increase the risk for behavioural or emotional problems.The reasons for this result may be that, to begin with our study group was very small, secondly the information on the children's behaviour was missing from a third of the children and thirdly we did not examine separately the effects of a single additional disability on the children's behaviour because of the small number of each additional disability. Comparison between the studies is difficult due to the different study designs and definitions and for the reason that in most studies are examined the effect of the single additional disability on a child's behaviour. Gillberg et al. (3), for instance, reported that 27% of the children with severe ID had epilepsy, and that it was particularly common among the children with psychotic behaviour. In the group of children with mild ID, on the other hand, only 10% suffered from epilepsy, and there were no differences between psychiatrically normal and abnormal children in respect of epilepsy. In the study by McQueen et al. (5), too, 87% of the children had at least one additional disability, and they showed a significant association between epilepsy and behavioural disorders among the children with severe ID. Jones and Cull (22) suggested that features of hyperactivity may be more likely to occur in children with severe ID and epilepsy. McQueen et al. (5) and Molteno et al. (8) reported that cerebral palsy did not increase the risk of psychiatric disturbances, but Goodman and Graham (18) showed an association between hemiplegia and psychiatric disorders.

To conclude, as a limitation of this study related to ID can be considered that because there was a large cohort study including nearly 9500 children, we had to use for all the children the same measurement. This instrument is developed for screening populations and its difficulty to use for the children with severe ID certainly reduced the response rate of the teachers. Secondly, the study was based on the previously collected information, nothing new clinical investigations were conducted this time. Only the level of ID and additional disabilities were revised from the registers and the hospital and institutional records. The individually conducted psychiatric interviews and psychological tests certainly would have given more accurate information on children's problems, but in this study it was not possible. Thirdly, we did not either examine differently children's behaviour related to the single additional disability, as due to the small number of the different diagnosis (Table 1) the statistical analysis would have not given the reliable information.

The study indicated that the children with ID had much more commonly psychiatric disturbances and behavioural and emotional problems than children without ID. These problems are very distressing for the children themselves and their families, and they also have a negative impact on their learning at school, peer relationships and social competence (31-33). The emotional and behavioural problems of children with ID are often the result of complex interactions between biological and psychosocial factors. Because these problems are more amenable to intervention in childhood than later in life, more attention should be paid to preventing their development by educational and environmental interventions that support parents and teachers. A comprehensive, interdisciplinary approach to treatment is most important.

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