Psychiatric Disorders in Norwegian 8- to 10-Year-Olds: An Epidemiological Survey of Prevalence, Risk Factors, and Service Use

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ABSTRACT

Objective: The Bergen Child Study is a longitudinal study of child mental health from the city of Bergen, Norway. We present methods and results from the first wave of the study, focusing on prevalence of disorders, associations with risk factors, and the use of services. **Method:** The target population included all 9,430 children attending grades 2 to 4 in Bergen schools during the academic year 2002/2003. The main screening instrument was the Strengths and Difficulties Questionnaire, whereas diagnoses were based on the Development and Well-Being Assessment. Information about child and family risk factors and service use was also obtained in this second stage. **Results:** In the first phase, the teacher Strengths and Difficulties Questionnaire was obtained for 9,155 (97%) of the target children and the matching parent Strengths and Difficulties Questionnaire for 6,297 (67%); 1,011 children (11%) were assessed with the Development and Well-Being Assessment in the second phase. The weighted prevalence for any *DSM-IV* psychiatric disorder was 7.0% (95% confidence interval 5.6%–8.5%). Disorders were associated with age, gender, learning difficulties, family type, and poverty. Although 75% of children with attention-deficit/hyperactivity disorder had been in contact with specialist mental health services, this was true for only 13% of those with pure emotional disorders. **Conclusions:** The overall prevalence of psychiatric disorders in children is relatively low in this Norwegian sample, when assessed with the Development and Well-Being Assessment. Children with emotional disorders have limited access to specialist services. *J. Am. Acad. Child Adolesc. Psychiatry,* 2007;46(4):438–447. **Key Words:** mental health, prevalence, risk factors, service use.

Population surveys have shown that mental disorders are common and often of early onset. Lifetime risk is close to 50%, with half of all cases starting before 14 years of age (Kessler et al., 2005). Most cases receive no treatment, and for treated cases, the delay before treatment may be decades (Wang et al., 2005). These findings represent major challenges for societies to provide effective treatment and prevention.

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Prior epidemiological surveys have sometimes reported extremely high prevalence rates for mental disorders in children and adolescents (Bird et al., 1988). Stricter impairment criteria in recent versions of the diagnostic systems as well as improved methodology may be the main reasons for a greater agreement and generally lower prevalence estimates in more recent surveys (Costello et al., 2003; Roberts et al., 1998). For adult surveys, a common set of methods has been introduced by the World Health Organization (Kessler and Ustun, 2004), but this is not the case for child and adolescent surveys. However, one recent methodological approach used in a range of settings and countries is the Development and Well-Being Assessment (DAWBA; Goodman et al., 2000). This structured multi-informant interview, which can be administered by lay interviewers but is scored by experienced clinical raters, has hitherto been used in completed or ongoing studies from 12 countries. Published prevalence estimates of youth mental disorders according to the DAWBA have varied from 7% in a rural Brazilian setting (Goodman et al., 2005a) to 15% for studies from Bangladesh (Mullick and Goodman, 2005) and Russia (Goodman et al., 2005b).

Not only prevalence for disorders but also risk factors may differ across countries. Recent studies have largely confirmed associations with child factors such as gender and age, with a higher rate of behavioral problems in younger boys and a higher rate of emotional problems in older girls (Canino et al., 2004; Costello et al., 2003; Ford et al., 2004). Learning disorders in the child also increases the risk of emotional and behavioral disorders (Ford et al., 2004; Goodman et al., 2005b). For family factors, however, recent findings are more ambiguous. Children from single-parent families appear to be at greater risk, but not in all studies (Canino et al., 2004; Goodman et al., 2005b). For traditional socioeconomic markers including low parent education and income, no increased risk was found in several recent studies (Canino et al., 2004; Goodman et al., 2005b). However, an important finding emerging from this literature seems to be that risk factors for mental disorders vary not only between cultures and societies but also with type of disorder, as suggested 25 years ago by Gillberg (1983).

The Nordic countries are generally characterized by high living standards and low economic and social stratification. However, given the multitude and complexity of risk factors for mental disorders, this guarantees neither generally good mental health in children nor the availability of effective services. In this article, we present the first large-scale survey of *DSM-IV* and *ICD-10* psychiatric disorders in the Nordic countries, focusing on prevalence, risk factors, and rates of service use.

METHOD

Sample

The target population of the Bergen Child Study of mental health (BCS) consisted of all children in the city of Bergen, Norway, attending primary school grades 2 to 4 (7–9 years of age) in the fall of 2002. The total number of children attending these grades was 9,430. It is not considered appropriate to ask about race or ethnicity in Norway, but the population is predominantly white. In 2002 6.4% of the Norwegian population were immigrants, and 66% were from non-Western countries. In the present sample, 6.7% of children spoke a foreign language at home, and 12% had an immigrant parent.

Setting

Bergen is the second largest city of Norway, with a total population of around 235,000. All 79 primary schools in Bergen took part in the study; all were mainstream public schools except for four special education public schools and 7 private schools. The special education schools are restricted to children with mental retardation. The private schools are based on religious or ideological orientation, except for an international school in which the teaching language is English. Each community has a public school psychology service as well as medical staff (nurse and doctor) working part time in schools. Bergen has four public specialist child and adolescent outpatient mental health clinics offering assessment and treatment at no cost to youths and their families. Referrals to specialist mental health services are usually provided by school services or family doctors. Parental consent is required for referral to school or specialist services.

Study Design

In the first screening phase, a four-page questionnaire was administered to parents and teachers through the schools in fall 2002. This questionnaire covered a wide range of symptoms as well as associated functional impairment. The second parent interview phase started during spring 2003 (mean age of child, 8.8 years [SD 0.9]) and included a structured psychiatric interview with parents of screen-positive children and parents of a random sample of screen-negative children (see below). Information on family type, socio-demographic variables, and service use for mental health problems was also obtained in this second stage. The present report is based on findings from these first two phases. A third direct assessment phase included assessment of cognitive and motor function, specific symptoms, and physical tests in selected subgroups of children from the second phase. The third phase will deal with aspects of disorders not central to themes presented here and will be detailed in other publications from the Bergen Child Study. Repeated assessments are

planned at 3-year intervals until adulthood, collecting longitudinal data on mental health for this cohort. The study was approved by the Regional Committee for Medical Research Ethics, West-Norway, and the Norwegian Data Inspectorate.

Screening Phase

The screening questionnaire covered a wide range of emotional and behavioral symptoms as well as associated functional impairment. The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1999, 2001) was chosen as the main instrument for the most frequent problem areas. Here, a total difficulties score is calculated by combining four problem subscale scores (emotional, conduct, hyperactivity-inattention, and peer problems), each containing five items. The SDQ also includes an impact supplement tapping functional impairment, in which informants are asked about severity and duration of symptoms, distress, interference with daily activities, and burden of the child's symptoms to others. Additional scales focusing on specific problem areas were included in the screening questionnaire. As a measure of concurrent validity of the SDQ, all oppositional defiant disorder and attention-deficit/hyperactivity disorder (ADHD) items from the *DSM-IV* and *ICD-10* classifications, consistent with the SNAP questionnaire (Swanson et al., 2001), were included in the screening questionnaire. Autistic symptoms were covered by the Autism Spectrum Screening Questionnaire (Ehlers and Gillberg, 1993; Posserud et al., 2006). Five specific items were added for obsessive-compulsive symptoms (Thomsen, 1998) and another five items tapping tic symptoms were also included (Apter et al., 1993). The parent version also contained five items covering eating problems, adapted from the Great Ormond Street Criteria (Nicholls et al., 2000), and one item on sleep problems. The teacher questionnaire also included two items on sluggish cognitive tempo. It took parents and teachers about 20 minutes to complete the four-page questionnaire, which was administered along with the informed consent form through the schools.

Teacher questionnaires were obtained for 9,155 children (97.1% of the target population). This represents the "Teacher Questionnaire" sample. Parents were contacted via school and asked permission for the teacher data to be stored on an "identified child" basis and to complete questionnaires themselves. For those who did not have parental permission, teacher data were stored without personal identification. Matching teacher and parent questionnaires were obtained for 6,297 identified children. This represents the "Combined Questionnaire" sample

Children were defined as screen positives if (1) the SDQ total difficulties score was above the 90th percentile cutoff according to parents or teachers, (2) there was severe impairment according to parents or teachers on the SDQ impact section (regardless of symptom scores), or (3) if the score on "narrow-band" scales exceeded the 98th percentile cutoff.

Interview Phase

From the Combined Questionnaire sample, the parents of all screen-positive children and the parents of a random sample of screen-negative children (see below) were invited to take part in the interview phase. This diagnostic phase consisted of the DAWBA, a psychiatric interview originally developed for the 1999 British Child and Adolescent Mental Health Survey (Goodman et al., 2000). The DAWBA is fully structured, but includes open-ended questions whenever a certain amount of symptoms and impact has been reported to allow for the respondent's own description of the problem. The version of the DAWBA used here covers in detail the common problem areas such as anxiety, depression, ADHD, and behavior problems as well as less frequent areas such as autism, tics, and eating disorders (DAWBA Interviews and Questionnaires, 2006). After a 2-day training course on the administration of the interview, 10 interviewers (mainly social sciences graduates) made arrangements with parents for interviews mainly at local community health clinics. An electronic format allowed local storage on laptops before transfer of data to a computer scoring program where data and text from all sections are presented to the clinical rater. Questionnaire data from teachers were included for the scoring of the oppositional defiant disorder and ADHD sections, allowing raters to combine information from parents and teachers when rating these sections. At the interview, parents were asked whether the child had learning difficulties or any physical disability. If they answered "yes," then they were asked about impact on a 4-point scale. Parents were also asked about family type, parental education, and household income. Finally, parents were asked whether the child had experienced problems leading to contact with relevant child services.

All of the interviews were scored by two experienced child psychiatrists (E.H. and an independent psychiatrist) who had completed the online training available for the DAWBA as well as a 2-day training session for raters. When in doubt, cases were flagged and discussed between raters. All diagnoses were finally reviewed and discussed with a third child psychiatrist (R.G.) who developed this instrument to ensure that rating thresholds were comparable to those of previous DAWBA studies. Interrater κ values were 0.91 for any disorder, 0.93 for emotional and conduct disorders, and 1.0 for ADHD.

Participation in the Interview Phase

From the Combined Questionnaire sample, 1,446 children were screen positive, and their parents were mailed invitation letters, with up to one written reminder being allowed by the ethics committee (but no telephone or personal contact). The final number of completed interviews for screen-positive children was 645 (44.6% of invited). A random 15% of screen-negative children were also invited to the interview phase ($n = 732$), resulting in 364 completed interviews for this group (49.7% of invited). Parents of two screen-negative children took part in the interview phase at their own instigation; these two children were given a weight of 1 (see below) for the analyses of the second phase data. Figure 1 presents a flowchart of the two phases.

Statistical Analyses

To estimate diagnostic characteristics of the screened population, we calculated probability weights for the sample participating in the second diagnostic phase. These probabilities were derived from a logistic regression model with participation in the diagnostic phase as the dependent variable, and total SDQ scores for teacher and parent as independent variables. The weights reflect the number of individuals in the first phase whom each record in the second phase represents. Weights were calculated both for the Combined Questionnaire sample ($N = 6,297$) and for the Teacher Questionnaire sample ($N = 9,155$). The latter group included children for whom a parent questionnaire with an ID matching a teacher questionnaire could not be found. For the calculation of weights for the Teacher Questionnaire sample,

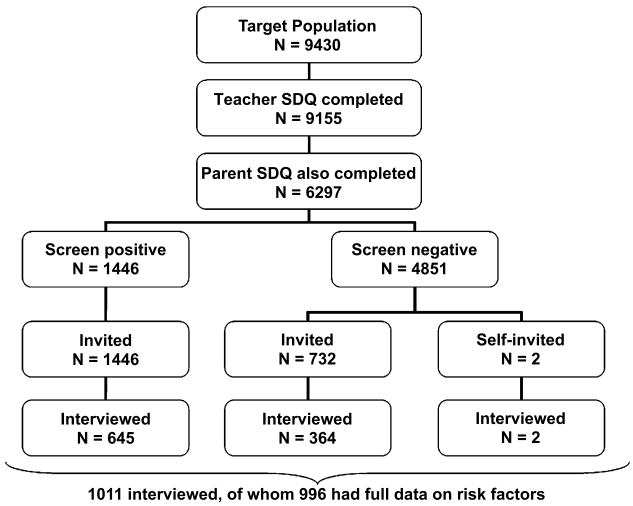

Fig. 1 Flow chart of screening and interview phases. SDQ = Strengths and Difficulties Questionnaire.

missing values for parent scores were replaced using a linear regression model. Full data on correlates were available for 996 of the 1,011 children (98.5%) with DAWBA assessments. To facilitate the comparison of adjusted and unadjusted analyses, all analyses for associations between risk factors and diagnoses were restricted to these 996 subjects. The prevalence of the main diagnostic groups was calculated by weighting back both to the Combined Questionnaire sample and the Teacher Questionnaire sample. Other analyses were weighted back to the Teacher Questionnaire sample alone because this represented 97% of the target population. Weighting was carried out using the survey (svy) commands of the Statistics/Data Analysis Program (STATA 9.1, Stata Corp., College Station, TX). Unadjusted, simple, logistic regression analyses were performed using each diagnosis (0 = no, 1 = yes) as the dependent variable, and risk factors as independent variables. Adjusted multiple analyses were done by including all of the risk factors that were statistically significant in the unadjusted analyses. Furthermore, we used logistic regression to determine the odds of comorbidity between any two of the main diagnostic groups (emotional disorders, behavior disorders, and ADHD) while adjusting for the third group. We examined associations with risk factors for the main diagnostic categories using χ^2 for trend.

RESULTS

Parent Response Bias

Whereas 97% of the target population was assessed by teacher questionnaires, only two thirds of these children's parents also completed questionnaires. Comparing the 6,297 children having questionnaire data from both informants with the 2,858 children with teacher data only, the latter group had significantly higher levels of teacher-reported psychopathology (mean teacher SDQ total score 5.37 [SD 5.4] versus 4.13 [SD 4.8]; t = 10.56, df = 9,153, p < .001). Allowing for this effect, there was no link between parental nonparticipation and the gender or age of the child.

A substantial number of parents invited to take part in the second phase did not reply even though they had participated in the first phase. This nonparticipation did not seem to be influenced by their child's level of psychopathology as judged by teacher and parent questionnaires. Among the screen-positive children whose parents were invited into the second phase, mean parent SDQ total score was 10.9 (SD 6.1) for the 801 nonparticipants as compared with 11.3 (SD 6.2) for the 645 participants (t = 1.3, df = 144, p = .18). The corresponding mean teacher SDQ scores were 9.6 (SD 6.7) and 9.2 (SD 6.3; t = 1.2, df = 144, p = .23). For the screen-negative children whose parents were invited, mean parent SDQ total scores were 4.2 (SD 3.0) for the 368 nonparticipants and 4.2 (SD 2.7) for the 364 participants (t = 0.1, df = 730, p = .89). The corresponding mean teacher SDQ scores were 2.6 (SD 2.5) and 2.4 (SD 2.6; t = 1.0, df = 730, p = .31). There were also no significant differences between participants and nonparticipants in age or gender for either screen-positive or screen-negative children.

Prevalence

Weighted prevalence estimates for the main diagnostic groups are presented separately for *DSM-IV* and *ICD-10* (Table 1). In two-phase studies, diagnostic data from the second phase are weighted back to the sample participating in the screening phase. In Table 1, diagnostic data are weighted back to two different samples: the Combined Questionnaire sample and the Teacher Questionnaire sample. Weighting back to the Combined Questionnaire sample is more akin to the majority of two-phase studies, in which typically no information on psychopathology is collected on the children of nonparticipating parents. By contrast, weighting back to the Teacher Questionnaire sample allows for the fact that parental nonresponse is associated with higher teacher-reported psychopathology and hence generates higher prevalence rates (most markedly for externalizing disorders). Given this advantage, all further analyses were weighted back to the Teacher Questionnaire sample. Thus, as shown in Table 1, the final best estimate of the prevalence of any *DSM-IV* psychiatric disorder is 7% for 8- to

TABLE 1
Prevalence Estimates (95% Confidence Intervals) for the Main Diagnostic Groups

	Combined Questionnaire Sample[a] (n = 6,297)		Teacher Questionnaire Sample[b] (N = 9,155)	
	DSM-IV	*ICD-10*	*DSM-IV*	*ICD-10*
Any disorder	6.1 (4.7–7.5)	6.0 (4.6–7.4)	7.0 (5.6–8.5)	6.9 (5.6–8.5)
Emotional disorders	3.2 (2.0–4.4)	3.2 (2.0–4.4)	3.3 (2.2–4.6)	3.4 (2.2–4.6)
Behavior disorders	2.5 (1.9–3.1)	2.4 (1.8–3.0)	3.2 (2.4–4.0)	3.1 (2.3–3.8)
ADHD/hyperkinetic disorder	1.3 (0.9–1.7)	1.1 (0.7–1.4)	1.7 (1.2–2.3)	1.4 (0.9–2.0)
Other disorders	0.8 (0.4–1.1)	0.8 (0.4–1.1)	0.9 (0.5–1.3)	0.9 (0.5–1.3)

Note: ADHD = attention-deficit/hyperactivity disorder; SDQ = Strengths and Difficulties Questionnaire.

[a] Estimated prevalence in the sample with complete parent and teacher SDQs (n = 6,297) based on probability weights applied to the interviewed sample (n = 1,011).

[b] Estimated prevalence in the sample with partial parent and complete teacher SDQs (N = 9,155) based on further probability weights to adjust for the parental nonresponse.

10-year-olds in Bergen. Emotional disorders (anxiety and depressive disorders) and behavior disorders (oppositional and conduct disorders) were the most common groups, followed by ADHD. The "other disorders" category included autism spectrum, tic, eating, and attachment disorders.

Comorbidity

The degree of overlap across two main diagnostic groups adjusting for gender and association with the third diagnostic group is illustrated in Figure 2. There was a strong association between behavior disorders and ADHD (odds ratio [OR] 75.1, 95% confidence interval [CI] 32.3–174.9; $p < .001$). The association between behavior and emotional disorders was weaker (OR 4.5, 95% CI 1.3–16.0; $p = .02$), whereas there was no statistically significant association between ADHD and emotional disorders (OR 2.2, 95% CI 0.5–10.6; $p = .5$). Twenty-six percent had one or more comorbid disorders, varying from 18% for emotional disorders to 48% for behavior disorders and 78% for ADHD.

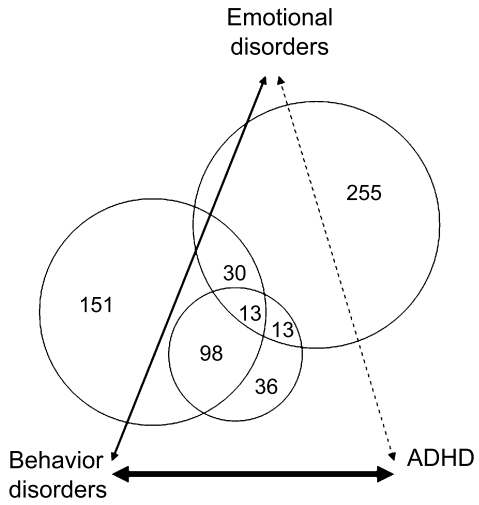

Fig. 2 Size and overlap of main *DSM-IV* diagnostic groups. Numbers are weighted back to the Teacher Questionnaire sample of 9,155 children. Arrows indicate the strength of associations between two groups, adjusted for gender and for association with the third group.

Prevalence of specific *DSM-IV* disorders are presented in Table 2, although caution should be exercised because of the wider confidence intervals when broken down to this level.

Risk Factors

Preliminary analyses showed no significant association between child mental disorders and maternal education, once paternal education was allowed for. Also, there was no association with physical disorders once learning difficulties were allowed for. Therefore, these variables are not presented here. Details from unadjusted analyses are presented in Table 3.

All six variables shown in Table 3 were subsequently entered into a multiple analysis (logistic regression). Although age was nonsignificant in the simple analyses, it was retained in the multiple analyses because of opposing trends for increasing rates of behavior disorders and decreasing rates of emotional disorders and ADHD with age. Hence, there is the possibility that age effects may become significant in an analysis adjusting for comorbidity. Age, learning difficulties (level of impairment), and parental education were entered as continuous variables, whereas family type and household income were dichotomized in line with

TABLE 2
Weighted Percentage Prevalence of DAWBA *DSM-IV* Disorders With 95% CI

Disorder	Prevalence	95% CI
Separation anxiety disorder	1.06	0.32–1.80
Specific phobia	1.84	0.85–2.83
Social phobia	0.22	0.02–0.42
Panic disorder	0.06	0–0.17
PTSD	0.11	0–0.23
OCD	0.17	0–0.34
Generalized anxiety disorder	0.20	0.02–0.38
Other anxiety disorder	0.14	0–0.27
Major depression	0.07	0–0.16
Other depression	0.11	0–0.23
ADHD Combined	1.36	0.84–1.87
ADHD Inattentive	0.26	0.05–0.47
ADHD Hyperactive-Impulsive	0.12	0–0.26
Oppositional defiant disorder	2.45	1.76–3.14
Conduct disorder	0.47	0.19–0.74
Other disruptive behavior disorder	0.28	0.07–0.50
Childhood autism	0.18	0–0.36
Asperger syndrome	0.13	0–0.27
Other pervasive developmental disorder	0.13	0–0.28
Anorexia nervosa	0.10	0–0.22
Tourette syndrome	0.16	0–0.31
Chronic tic disorder	0.04	0–0.13
Attachment disorder	0.16	0–0.32

Note: DAWBA = Development and Well-Being Assessment; PTSD = posttraumatic stress disorder; OCD = obsessive-compulsive disorder.

unadjusted findings, distinguishing traditional from nontraditional families and defining poverty as the lowest income band. No associations with paternal education remained statistically significant, and this variable was therefore removed, and the logistic regression repeated. Because all of the remaining risk factors were significantly associated with at least one type of disorder, no further risk factors were dropped.

Details of the final adjusted analysis are shown in Table 4. For behavior disorders, statistically significant associations were found for male gender, learning difficulties, and nontraditional family. Emotional disorders were significantly associated with learning difficulties and nontraditional family type. ADHD was significantly associated with learning difficulties and being younger.

Service Use

Table 5 shows the proportion of children for whom parents reported contact (previous or current) with services because of mental health problems.

The ADHD group includes children whose ADHD was comorbid with emotional or behavior disorders. The behavior disorder group includes children with comorbid emotional disorders, but not children with comorbid ADHD. The emotional disorders group did not include children who also had ADHD or behavior disorders. This hierarchical system ensured that the ADHD, behavior disorders, and emotional disorders rows in Table 5 were based on nonoverlapping groups of children. Most children with ADHD had been in contact with school psychology, special education, and mental health services. Most children with behavior disorders had been seen by the school psychology service, but less than half by specialist mental health services. Children with emotional disorders had less often been in contact with services.

DISCUSSION

Overall Prevalence

This first Nordic large-scale survey of *DSM-IV* and *ICD-10* disorders in a child population suggests an overall prevalence of mental disorders of about 7%. Although this is at the lower end of the range compared with studies from other parts of the world, it is in no way unique. A prospective population survey from North Carolina reported a prevalence of 6.8% for *DSM-IV* disorders in 9- to 16-year-olds, when "significant functional impairment" was required for diagnosis (Costello et al., 2003). The corresponding figure from a recent study in Puerto Rican 4- to 17-year-olds was 6.9% (Canino et al., 2004). However, for both of these studies, assessment methods differed from those of the present study.

In the first study with the DAWBA (the British survey from 1999), an overall prevalence of 9.5% in 5- to 15-year-olds was reported for both *DSM-IV* and *ICD-10* disorders (Ford et al., 2003; Meltzer et al., 2000, 2003). For 8- to 10-year-olds (comparable to the study reported here), a somewhat lower prevalence of 8.6% was reported. Other surveys using the SDQ and the DAWBA have mostly reported higher rates; 12.7% for 7- to 14-year-olds in Taubate, Brazil (Fleitlich-Bilyk and Goodman, 2004), 15.2% for 5- to 10-year-olds in Dhaka, Bangladesh (Mullick and Goodman, 2005), and 15.3% for 7- to 14-year-olds in Novosibirsk, Russia (Goodman et al., 2005b). An exception was a study of a rural island community in northeast Brazil, where

TABLE 3
Unadjusted Analyses of Child and Family Correlates of the Main *DSM-IV* Diagnostic Categories

Variable	No. of Children	Any *DSM-IV* Disorder, %	Emotional Disorders, %	Behavior Disorders, %	ADHD, %
Gender					
Male	595	8.7*	3.2	5.1***	3.0***
Female	401	5.0	3.6	0.9	0.3
Age, y					
8	389	8.1	4.2	3.1	2.1
9	349	5.8	3.2	2.6	1.1
10	258	6.6	2.2	4.0	1.8
Learning difficulties					
No	847	4.6***	2.6***	1.9***	0.8***
Yes, no impact	24	10.8	3.8	10.8	0
Yes, little impact	46	26.3	21.1	5.0	4.9
Yes, moderate impact	53	40.8	9.0	27.7	19.0
Yes, severe impact	26	65.5	12.9	28.5	34.2
Family type					
Traditional	675	4.4***	2.1**	1.8***	1.0***
Single parent	158	17.2	8.3	8.0	4.5
Reconstituted	130	10.4	5.2	6.0	2.7
Adopted	25	13.2	10.0	2.0	2.0
Foster	8	63.0	9.6	42.9	24.3
Paternal education					
Compulsory, <11 y	93	10.3*	4.2	5.5**	3.8*
Technical qualification, 2–3 y	280	10.1	5.1	4.7	3.3
Academic qualification, 2–3 y	100	8.0	3.4	5.1	1.1
University lower, ≤4 y	282	4.6	2.1	2.2	0.9
University higher, >4 y	241	5.5	3.1	1.5	0.9
Household income, $					
<30,000	72	30.1***	15.0**	17.7***	10.7***
30,000–60,000	176	8.6	3.9	4.0	2.7
60,000–90,000	323	5.6	2.8	2.5	1.1
90,000–120,000	297	5.5	2.7	2.5	1.3
>120,000	128	5.6	2.6	1.5	0.8

Note: The number of children for each row is shown unweighted, while percentage of prevalence of disorders and significance levels (χ^2) are based on weighted data. Traditional family type is defined as living with both biological parents.

* $p < .05$; ** $p < .01$; *** $p < .001$.

an overall prevalence of 7.0% for *DSM-IV* disorders was reported for 5- to 14-year-olds (Goodman et al., 2005a).

A recent smaller Nordic survey of *DSM-IV* disorders from Funen, Denmark, reported a prevalence of 10.1% in 8- to 9-year-olds (Bilenberg et al., 2005). However,

TABLE 4
Adjusted Analyses of Child and Family Correlates of the Main *DSM-IV* Diagnostic Categories

	Any *DSM-IV* Disorder	Emotional Disorders	Behavior Disorders	ADHD
Male gender	1.41 (0.81–2.44)	0.61 (0.28–1.34)	4.11*** (1.88–8.95)	2.86 (0.75–10.94)
Age (continuous)	0.69* (0.48–0.98)	0.61 (0.34–1.08)	1.26 (0.84–1.88)	0.48* (0.24–0.99)
Learning difficulties (continuous)	2.54*** (2.09–3.10)	1.72*** (1.27–2.32)	1.60** (1.23–2.08)	2.39*** (1.68–3.41)
Nontraditional family type	3.23*** (1.80–5.79)	2.75* (1.15–6.57)	2.89** (1.51–5.52)	1.88 (0.62–5.66)
Poverty	2.52* (1.14–5.56)	2.10 (0.67–6.68)	2.43 (0.87–6.74)	1.62 (0.41–6.41)

Note: Figures presented are odds ratios, with 95% confidence interval in parentheses. The three broad-band diagnostic categories were adjusted for comorbidity. Variables were dichotomous, except for age (years) and learning disability (degree of impact).

* $p < .05$; ** $p < .01$; *** $p < .001$.

TABLE 5
Level of Service Use (Previous or Current) for Broad *DSM-IV* Diagnostic Groups

	School Psychology, %	Special Education, %	School Health, %	Mental Health, %	Child Welfare, %
ADHD[a]	87.2	83.6	56.2	74.5	24.6
Behavior disorders[b]	79.3	49.5	41.9	41.4	27.6
Emotional disorders[c]	29.4	33.2	16.4	13.3	3.2
No disorder	11.7	18.5	16.2	2.4	0.9
Total sample	15.1	20.8	17.4	4.8	2.1

The three broad-band groups were hierarchically arranged to ensure nonoverlapping groups of children.
[a] Including children with comorbid behavior and emotional disorders.
[b] Including children with comorbid emotional disorders, but not ADHD.
[c] Not including children with comorbid ADHD or behavioral disorders.

here too, screening and diagnostic measures differed from those used in the present study, and the study had a low response rate for the screening phase (51%).

A number of factors may have contributed to the relatively low overall rate for *DSM-IV* and *ICD-10* disorders reported here. First, the diagnostic procedure used in the DAWBA allows the use of open-ended questions and transcripts to assess whether the respondent has understood the questions and whether the severity seems to indicate a need for clinical intervention. Each problem section also incorporates a structured assessment of domain-specific impact on everyday functioning. The range of disorders covered by the DAWBA is somewhat limited compared with some other measures and does not specifically address elimination, somatization, psychotic, or substance abuse disorders. It is possible that the use of other methods for diagnosis, such as child interview or direct observation procedures, may have produced higher prevalence rates.

Second, the age range included here was limited to 8- to 10-year-olds, who probably represent a group with a lower rate of disorders than in the adolescent period (Canino et al., 2004; Costello et al., 2003; Ford et al., 2003). For specific disorders, however, the interaction with age is more complex; ADHD, specific phobia, and separation anxiety are more common before than during adolescence, whereas depression, social phobia, panic disorder, psychotic disorders, eating disorders, and substance abuse become more common in adolescence. Future waves of the study will address the offset and onset of specific disorders for this cohort.

Third, the relatively low prevalence reported here could also reflect less poverty and social stratification in the Nordic countries compared with other economic and political systems. An association with socioeconomic factors was evident for emotional and behavior disorders, which were the most common groups in this as in many previous surveys. Although an effect of income remained in the adjusted analyses, this was restricted to the lowest income band representing only 7% of the sample. A higher poverty rate and greater social inequality in other countries may have contributed to higher rates of disorders in other studies (Fleitlich-Bilyk and Goodman, 2004; Mullick and Goodman, 2005). However, it is also conceivable that a lower prevalence may reflect genetic differences between populations.

Type of Disorder and Comorbidity

The overall pattern of disorders was similar to other recent surveys focusing on child and adolescent mental health. Emotional and behavior disorders were the most frequent, followed by ADHD/hyperkinetic disorder (Canino et al., 2004; Costello et al., 2003; Fleitlich-Bilyk and Goodman, 2004; Ford et al., 2003). There was overall a close correspondence between *DSM-IV* and *ICD-10* rates of disorders.

The reported prevalence of 1.7% for ADHD is low compared with most previous studies; however, the other two recent large-scale *DSM-IV* population surveys also report more conservative prevalence estimates. The total ADHD prevalence was 2.5% for 8- to 10-year-olds in the British national survey (Ford et al., 2003) and 2.2% for 9- to 10-year-olds in a U.S.-based survey (Costello et al., 2003). These lower prevalence estimates cannot be explained only by the diagnostic instruments because these differ across the studies mentioned here. Rather, impairment criteria

included in recent versions of the diagnostic classifications may be of importance, especially when evaluated from the respondent's examples from everyday life. Clearly, the possibility of ADHD being less prevalent than previously believed is important to address in future surveys because treatments offered show great variations between countries and clearly involve risks as well as benefits to children.

An overall comorbidity rate of 29% is also very much in line with recent reports in youths, ranging from 24% to 29% (Costello et al., 2003; Fleitlich-Bilyk and Goodman, 2004; Ford et al., 2003). However, as shown here, comorbidity rates differ markedly between disorders (ranging from 18% to 78%).

The striking association between ADHD and behavior disorders and the lack of association between ADHD and emotional disorders corresponds to other surveys in which the association with the third group of disorders was properly controlled for in the analysis (Costello et al., 2003; Fleitlich-Bilyk and Goodman, 2004; Ford et al., 2003).

Risk Factors

The observed associations with male gender and learning disabilities have been confirmed in other recent surveys of child mental disorders across different economic and cultural settings (Canino et al., 2004; Costello et al., 2003; Ford et al., 2003; Goodman et al., 2005b). In spite of the narrow age range in this first wave of the study, mental disorders were associated with being younger, primarily resulting from an association between ADHD and younger age. Emotional and behavior disorders showed associations with family type, suggesting that these disorders may be influenced more by social factors than is ADHD. Similar findings were reported also in the British 1999 survey (Ford et al., 2003). However, because of the cross-sectional design of these studies, causality cannot be inferred, and correlates may therefore best be used to identify risk groups toward whom prevention and early intervention for mental disorders may be targeted. We hope to expand the assessment of risk and protective factors in future waves of this longitudinal study.

Service Use

Most children with behavior disorders and ADHD had been in contact with school services. Although most children with ADHD also had been in contact with specialist services, this was rarely the case for children with pure emotional disorders. This could reflect a milder nature of emotional disorders, but also the fact that internalizing problems are less disruptive and less likely to come to the attention of parents and teachers. These findings are in line with the adult literature in which a particularly long delay between onset and treatment has been demonstrated for emotional disorders (Wang et al., 2005). This may indicate a need for a more integrated system for detection and effective treatment for emotional disorders in particular.

Limitations

The considerable attrition at the interview phase could be seen to be a major drawback of the study. However, through regression analysis, we were able to adjust for differences in reported problem levels between participant and nonparticipants. We therefore believe that the sizable attrition at this phase has not rendered the current data unreliable or unrepresentative.

Although this study was not designed to be nationally representative, a comparison of questionnaire data with the SDQ from other regions of Norway, as well as other Nordic countries, showed similar levels of emotional and behavioral problems reported by teachers, parents, and youths (Obel et al., 2004). This may reflect the relative uniformity (cultural, economic, and political) within and between the Nordic countries. Thus, it is likely that our prevalence rates are relatively representative for Norway as well as for the Nordic countries in general.

Clinical Implications

The relatively low prevalence of child mental disorders reported here may reflect less social inequality in Norway than in many other countries. Risk factors vary between disorders, and family factors were especially important for emotional and conduct disorders. The pattern of disorders and comorbidity was similar to what has been reported from other countries. Service use differed strikingly across disorders. Many children with ADHD but few with pure emotional disorders had been referred to specialist mental health services. Based on the presented findings, it seems to be an important goal to increase the availability of effective detection and interventions for emotional problems in school-age children.

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REFERENCES

Apter A, Pauls DL, Gadot N et al. (1993), An epidemiologic study of Gilles de la Tourette's syndrome in Israel. *Arch Gen Psychiatry* 50:734–738

Bilenberg N, Petersen DJ, Hoerder K, Gillberg C (2005), The prevalence of child-psychiatric disorders among 8–9-year-old children in Danish mainstream schools. *Acta Psychiatr Scand* 111:59–67

Bird HR, Canino G, Rubio-Stipec M et al. (1988), Estimates of the prevalence of childhood maladjustment in a community survey in Puerto Rico. The use of combined measures. *Arch Gen Psychiatry* 45:1120–1126

Canino G, Shrout PE, Rubio-Stipec M et al. (2004), The DSM-IV rates of child and adolescent disorders in Puerto Rico: prevalence, correlates, service use, and the effects of impairment. *Arch Gen Psychiatry* 61: 85–93

Costello EJ, Mustillo S, Erkanli A, Keeler G, Angold A (2003), Prevalence and development of psychiatric disorders in childhood and adolescence. *Arch Gen Psychiatry* 60:837–844

DAWBA Interviews and Questionnaires (2006), available at: *http://www.dawba.com/b0.html*. Accessed November 15, 2006

Ehlers S, Gillberg C (1993), The epidemiology of Asperger syndrome. A total population study. *J Child Psychol Psychiatry* 34:1327–1350

Fleitlich-Bilyk B, Goodman R (2004), Prevalence of child and adolescent psychiatric disorders in southeast Brazil. *J Am Acad Child Adolesc Psychiatry* 43:727–734

Ford T, Goodman R, Meltzer H (2003), The British Child and Adolescent Mental Health Survey 1999: the prevalence of DSM-IV disorders. *J Am Acad Child Adolesc Psychiatry* 42:1203–1211

Ford T, Goodman R, Meltzer H (2004), The relative importance of child, family, school and neighbourhood correlates of childhood psychiatric disorder. *Soc Psychiatry Psychiatr Epidemiol* 39:487–496

Gillberg C (1983), Perceptual, motor and attentional deficits in Swedish primary school children. Some child psychiatric aspects. *J Child Psychol Psychiatry* 24:377–403

Goodman R (1999), The extended version of the Strengths and Difficulties Questionnaire as a guide to child psychiatric caseness and consequent burden. *J Child Psychol Psychiatry* 40:791–799

Goodman R (2001), Psychometric properties of the strengths and difficulties questionnaire. *J Am Acad Child Adolesc Psychiatry* 40:1337–1345

Goodman R, Ford T, Richards H, Gatward R, Meltzer H (2000), The Development and Well-Being Assessment: description and initial validation of an integrated assessment of child and adolescent psychopathology. *J Child Psychol Psychiatry* 41:645–655

Goodman R, Neves dos Santos D, Robatto Nunes AP, Pereira de Miranda D, Fleitlich-Bilyk B, Almeida Filho N (2005a), The Ilha de Mare study: a survey of child mental health problems in a predominantly African-Brazilian rural community. *Soc Psychiatry Psychiatr Epidemiol* 40:11–17

Goodman R, Slobodskaya H, Knyazev G (2005b), Russian child mental health-a cross-sectional study of prevalence and risk factors. *Eur Child Adolesc Psychiatry* 14:28–33

Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE (2005), Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 62:593–602

Kessler RC, Ustun TB (2004), The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res* 13:93–121

Meltzer H, Gatward R, Goodman R, Ford T (2000), *Mental Health of Children and Adolescents in Great Britain*. London: The Stationery Office

Meltzer H, Gatward R, Goodman R, Ford T (2003), Mental health of children and adolescents in Great Britain. *Int Rev Psychiatry* 15:185–187

Mullick MS, Goodman R (2005), The prevalence of psychiatric disorders among 5–10 year olds in rural, urban and slum areas in Bangladesh: an exploratory study. *Soc Psychiatry Psychiatr Epidemiol* 40:663–671

Nicholls D, Chater R, Lask B (2000), Children into DSM don't go: a comparison of classification systems for eating disorders in childhood and early adolescence. *Int J Eat Disord* 28:317–324

Obel C, Heiervang E, Rodriguez A et al. (2004), The strengths and difficulties questionnaire in the Nordic countries. *Eur Child Adolesc Psychiatry* 13(suppl 2):II32–II39

Posserud MB, Lundervold AJ, Gillberg C (2006), Autistic features in a total population of 7–9-year-old children assessed by the ASSQ (Autism Spectrum Screening Questionnaire). *J Child Psychol Psychiatry* 47: 167–175

Roberts RE, Attkisson CC, Rosenblatt A (1998), Prevalence of psychopathology among children and adolescents. *Am J Psychiatry* 155: 715–725

Swanson JM, Kraemer HC, Hinshaw SP et al. (2001), Clinical relevance of the primary findings of the MTA: success rates based on severity of ADHD and ODD symptoms at the end of treatment. *J Am Acad Child Adolesc Psychiatry* 40:168–179

Thomsen PH (1998), Obsessive-compulsive disorder in children and adolescents. Clinical guidelines. *Eur Child Adolesc Psychiatry* 7:1–11

Wang PS, Berglund P, Olfson M, Pincus HA, Wells KB, Kessler RC (2005), Failure and delay in initial treatment contact after first onset of mental disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 62:603–613

Matters of Spirituality at the End of Life in the Pediatric Intensive Care Unit Mary R. Robinson, MA, MDiv, Martha Thiel, MDiv, Meghan M. Backus, BA, Elaine C. Meyer, PhD, RN

Objective: Our objective with this study was to identify the nature and the role of spirituality from the parents' perspective at the end of life in the PICU and to discern clinical implications. *Methods:* A qualitative study based on parental responses to open-ended questions on anonymous, self-administered questionnaires was conducted at 3 PICUs in Boston, Massachusetts. Fifty-six parents whose children had died in PICUs after the withdrawal of life-sustaining therapies participated. *Results:* Overall, spiritual/religious themes were included in the responses of 73% (41 of 56) of parents to questions about what had been most helpful to them and what advice they would offer to others at the end of life. Four explicitly spiritual/religious themes emerged: prayer, faith, access to and care from clergy, and belief in the transcendent quality of the parent-child relationship that endures beyond death. Parents also identified several implicitly spiritual/religious themes, including insight and wisdom; reliance on values; and virtues such as hope, trust, and love. *Conclusions:* Many parents drew on and relied on their spirituality to guide them in end-of-life decision-making, to make meaning of the loss, and to sustain them emotionally. Despite the dominance of technology and medical discourse in the ICU, many parents experienced their child's end of life as a spiritual journey. Staff members, hospital chaplains, and community clergy are encouraged to be explicit in their hospitality to parents' spirituality and religious faith, to foster a culture of acceptance and integration of spiritual perspectives, and to work collaboratively to deliver spiritual care. **Pediatrics** 2006;118:e719–e729.