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ORIGINAL CONTRIBUTION

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# DSM-IV or ICD-10-DCR diagnoses in child and adolescent psychiatry: does it matter?

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**Abstract** *Objective* DSM-IV is the most widely used diagnostic classification system in research, whereas ICD-10 is more widely used clinically. Knowledge of differences is essential when research findings are implemented in daily clinical practice. We examined differences between the two diagnostic systems regarding three major child psychiatric diagnostic categories. *Methods* A total of 199 consecutively referred, child psychiatric patients were interviewed with a semistructured diagnostic interview (K-SADS-PL) including questions covering specific ICD-10-DCR criteria, and diagnosed according to both diagnostic systems. *Results* Differences were found regarding the diagnoses major depressive disorder/depressive episode and attention deficit hyperactivity disorder/disturbance of activity and attention. In both cases, more children met DSM-IV-TR criteria than ICD-10-DCR criteria. The diagnosis, oppositional defiant disorder, proved interchangeable between the two diagnostic systems. *Conclusion* Differences between diagnostic systems must be taken into account when research findings using one diagnostic system are implemented with children diagnosed by another diagnostic system.

**Key words** child psychiatry – International Classification of Diseases – Diagnostic and Statistical Manual of Mental Disorders – depressive disorder – attention deficit and disruptive behavioural disorder

## Introduction

DSM-IV [2] and ICD-10 [24] are the most prominent diagnostic classification systems in psychiatry. ICD-10 is the most frequently used system worldwide for clinical diagnosis and training, whereas DSM-IV is the most frequently used system for research [13]. Much effort has been put into approximating the two systems, but significant differences still remain [4, 16]. This may cause problems for the generalisability of research findings. To what extent we can apply knowledge gained from research to clinical populations is essential for evidence-based medicine. Differing diagnostic criteria in research and clinical practice are one obstacle to this. Revision of the ICD-10 has been set for 2010, and more research is needed before revision can be successfully completed [4]. In 2002, Steinberger et al. found the DSM-IV criteria for diagnosing obsessive-compulsive disorder (OCD) in children superior to those of the ICD-10 [21]. To our knowledge, no other study has investigated the clinical implications for child and adolescent psychiatry of the differences between the two major classification systems.

The aim of this study was to examine differences between the DSM-IV-TR categories major depressive disorder (MDD), attention deficit hyperactivity disorder (ADHD), and oppositional defiant disorder (ODD) and

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the corresponding diagnoses in ICD-10-DCR when applied to a child psychiatric population. These three disorders are prevalent in clinical [19] as well as epidemiologic [5] samples.

## Methods

### Study population

The sample consisted of 199 consecutively, first-ever admitted children, aged 8–13 years, at the Psychiatric Hospital for Children and Adolescents, Risskov, Denmark, in the study period (1 December 2001–6 June 2003). We excluded children who were either not seen at the clinic or only briefly seen but not offered child psychiatric assessment. Twelve were inpatients, 187 were outpatients.

The hospital is the only child psychiatric clinic covering the county of Aarhus (population 644,666, including 48,131 children, 8–13 years old on 1 January 2002).

### Diagnostic procedures

The children were interviewed with the Schedule for Affective Disorders and Schizophrenia for Children – Present and Lifetime version (K-SADS-PL) [9] as part of the standard examination procedure. K-SADS-PL is a widely used semistructured diagnostic interview. It has been validated for use in clinical populations [1, 9, 17]. Additional questions for ICD-10-DCR criteria not covered by the K-SADS-PL were included. The interview took place as soon after the initial contact as possible. Parents were interviewed first (one or both) and the child as soon as possible afterwards. In three cases, the child interview took place first for practical reasons. The first author (M. S.) performed all interviews and rated K-SADS-PL without considering diagnostic information from other sources. According to research findings [3, 8], parents were regarded as the optimal informants about behavioural or easily observable symptoms, whereas children were regarded optimal informants about symptoms of emotions, thoughts, or affect. The interviewer then used her clinical experience to make a common score also considering the quality of information from each respondent, which might be reduced by lack of cooperation or reduced age or mental capacity of the child [6]. The interviewer scored diagnoses according to DSM-IV as well as ICD-10-DCR criteria and gave two sets of diagnoses. Sleep changes of any kind were considered sleep disturbance according to the instructions in the K-SADS-PL interview. The question of loss of libido was not considered relevant in this age group and was not asked. We regarded the item "depressed mood" according to DSM-IV as met if the K-SADS-PL criteria "depressed mood most of the time for more than 50 % of the days" was met. In order to assess the ICD-10 criterion "depressed mood largely uninfluenced by circumstances", we combined the criterion "depressed mood" with the criterion "non-reactivity of mood" present at least at subthreshold level. Subthreshold level requires that the child is "somewhat responsive but still feels depressed. Mood improves partially and stays like that for more than a few minutes". We did not have data to assess the criterion for attention deficit hyperactivity disorder in ICD-10-DCR that all criteria must be met in more than one setting; thus, if symptoms were present in more than one setting, this criterion was regarded as met.

The interviewer assigned diagnoses according to DSM-IV/ICD-10-DCR criteria if the child met criteria for a disorder at some time during the course of illness and there had not been a period of 2 months of complete remission.

We did not consider exclusion criteria in any of the diagnostic systems.

We categorised the diagnostic groups, depressive conduct disorder and hyperkinetic conduct disorder, in ICD-10 as conduct disorder as well as depressive disorder or hyperkinetic disorder, respectively, in order not to inflate artificially rates of disagreement.

### Statistics

We used the kappa coefficient to measure interrater reliability for DSM-IV diagnoses. For analyses of age and gender differences, we used non-parametric tests because these variables were not normally distributed in the sample. We conducted all analyses by using the Statistical Package for the Social Sciences [20].

### Reliability

Interviewer and rater training included a theoretical training course in ICD-10/DSM-IV, live and videotaped K-SADS interviews with non-referred children, and live K-SADS interviews with child psychiatric patients. The interviews were videotaped and rated by a second rater. The entry criterion for the interviewer and the second rater was 100 % diagnostic agreement on three consecutive videotaped interviews. The second rater reassessed video recordings of 20 interviews (patients with mixed diagnoses) during the study period and diagnosed the interviews according to DSM-IV diagnostic criteria. According to Landis and Koch [12], kappa values for current disorders were almost perfect (0.81–1) for ODD and substantial (0.61–0.80) for MDD and ADHD.

## Results

### Description of the sample

The sample consisted of 147 boys and 52 girls aged 8–13 years. MDD was found in 33 (16.6 %), ODD in 47 (23.6 %), and ADHD in 71 (35.7 %) children using K-SADS-PL. These were the most prevalent diagnoses in the sample. The diagnostic distribution can be seen in Table 1.

Significantly more girls (29 %) than boys (12 %) had MDD ($\chi^2 = 7.65$; $p = 0.006$). The comorbid disorders anorexia nervosa (Fisher's Exact Test; $p = 0.008$) and separation anxiety disorder (Fisher's Exact Test; $p = 0.021$) were significantly more prevalent in the depressed group than in the non-depressed group.

Significantly more boys (42 %) than girls (17 %) had ADHD ($\chi^2 = 10.35$; $p = 0.001$). OCD ($\chi^2 = 9.78$; $p = 0.001$) was significantly more prevalent in the non-ADHD group whereas ODD ($\chi^2 = 15.3$; $p < 0.001$) was significantly more prevalent in the ADHD group than expected.

There was no significant gender difference in the presence of ODD (17 % girls, 26.5 % boys) and, apart from the above-mentioned association with ADHD, no significant differences in comorbidity were found between the ODD group and the non-ODD group. For further description of the sample see Sorensen et al. [18].

**Table 1** Diagnostic distribution in the total sample

| Diagnosis | n |
|---|---|
| MDD | 33 |
| Brief recurrent depression | 1 |
| Dysthymia | 1 |
| Cyclothymia | 1 |
| Separation anxiety | 11 |
| Specific phobia | 21 |
| Social anxiety | 7 |
| Generalised anxiety | 21 |
| OCD | 21 |
| Adjustment disorder | 12 |
| Enuresis | 23 |
| Encopresis | 12 |
| Anorexia Nervosa | 6 |
| ADHD | 71 |
| CD | 1 |
| ODD | 47 |
| Tourette's syndrome | 10 |
| Tics | 15 |
| Psychosis | 9 |

### Major depressive disorder

The diagnoses MDD and "depressive disorder" differ in the two systems on several points such as number of symptoms required, number and type of core symptoms required, possibility for depressed mood to be irritable mood, and demands of depressed mood to be uninfluenced by circumstances.

In all, 33 children had the diagnosis MDD according to DSM-IV-TR criteria (see Table 2). Eight (24 %) of these children did not meet ICD-10-DCR criteria for depressive disorder, because they failed to meet the criterion "at least two core symptoms". Half of these children had six or seven DSM-IV-TR depressive symptoms and would, thus, be classified as moderately to severely depressed according to DSM-IV-TR severity specifier. Thus, using DSM-IV-TR as the gold standard, the ICD-10-DCR had sensitivity for MDD of 76 % and specificity of 99 %. Of the 33 children with a DSM-IV-TR diagnosis of MDD, 31 met the criterion "depressed mood". Of these 31 children, 16 (52 %) met the ICD-10-DCR criterion "depressed mood largely uninfluenced by circumstances". This criterion was met significantly more often by girls than by boys with depressed mood ($\chi^2 = 7.43$; $p = 0.006$). One (4 %) of 26 children with an ICD-10 diagnosis of depressive disorder did not meet DSM-IV-TR criteria for MDD because the child had only four depressive symptoms.

Among children with a depressive disorder according to one diagnostic system, we compared mean age and gender in the nine cases, in which there was disagreement about the presence of a depressive disorder, with the 25 cases, in which there was agreement. We found the group in which there was agreement slightly older (11.8 vs. 10.3 years; Mann-Whitney test; $p = 0.04$). We found no differences with regard to gender (Fisher's exact test; $p = 0.45$) or with regard to any comorbid psychiatric disorder between the two groups.

Five children had a specifier of melancholic features according to the DSM-IV-TR system. One of these had a somatic syndrome according to the ICD-10-DCR system. No child had a diagnosis of somatic syndrome according to ICD-10-DCR without a specifier of melancholic features according to DSM-IV-TR.

**Table 2** DSM-IV: major depressive episode vs. ICD-10-DCR: depressive episode

| | | ICD-10-DCR | | |
|---|---|---|---|---|
| | | + | – | |
| DSM-IV-TR | + | 25 | 8 | 33 |
| | – | 1 | 165 | 166 |
| Total | | 26 | 173 | 199 |

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### Attention deficit hyperactivity disorder

A total of 71 children had the diagnosis ADHD according to DSM-IV-TR. Of these, 17 (24 %) did not have the diagnosis "disturbance of activity and attention" (F90.0 or F90.1) or the diagnosis "attention deficit without hyperactivity" (F98.8) according to ICD-10-DCR (Table 3). These children all had a DSM-IV diagnosis of ADHD, primarily hyperactive-impulsive. ICD-10-DCR has no diagnostic category for these children. Using DSM-IV-TR as gold standard, the ICD-10-DCR has a sensitivity for ADHD of 76 % and a specificity of 99 %. One (2 %) of 55 children who had one of the above ICD-10-DCR diagnoses did not meet the DSM-IV-TR age criterion for ADHD.

Among children with a diagnosis of ADHD/"disturbance of activity and attention" or "disturbance of attention without hyperactivity" according to one diagnostic system, we compared age and gender in the 54 cases in which there was agreement with the 18 cases in which there was disagreement. We found no gender (Fisher's exact test; $p = 1$) or age (Mann-Whitney; $p = 0.96$) differences.

There were no differences in the occurrence of comorbid disorders between the ADHD children with or without a diagnosis of attention problems according to the ICD-10-DCR.

### Oppositional defiant disorder

The diagnosis of ODD differs slightly between the two diagnostic systems. According to ICD-10-DCR, up to two items from the conduct disorder (CD) section can be counted as symptoms of ODD. This is not the case in DSM-IV.

In all, 47 children met DSM-IV-TR criteria for ODD. All of these children also met ICD-10-DCR criteria for ODD. One child met ICD-10-DCR but not DSM-IV-TR criteria for ODD because two of the symptoms belonged to the symptoms 9–23 in ICD-10-DCR.

**Table 3** DSM-IV: attention deficit hyperactivity disorder vs. ICD-10-DCR: disturbance of activity and attention/disturbance of attention without hyperactivity

| | | ICD-10-DCR | | |
|---|---|---|---|---|
| | | + | − | |
| DSM-IV-TR | + | 54 | 17 | 71 |
| | − | 1 | 127 | 128 |
| Total | | 55 | 144 | 199 |

## Discussion

The disagreements between DSM-IV-TR and ICD-10-DCR regarding MDD and ADHD were moderate, but certain important differences were identified.

Regarding MDD, the prevalence of 16 % is higher than found in clinically diagnosed samples [18, 19], but equivalent to the prevalence found in systematically assessed samples [7, 10]. DSM-IV-TR included more children in the MDD diagnosis than did ICD-10-DCR in the corresponding diagnostic categories. Half of the children with a DSM-IV-TR diagnosis of MDD and no ICD-10-DCR diagnosis were moderately to severely depressed according to the severity specifier in DSM-IV-TR. Thus, clinicians using the ICD-10-DCR may overlook quite a large number of children with clinically relevant depression who are in need of treatment.

The fact that ICD-10-DCR requires depressed mood to be largely uninfluenced by circumstances meant that only 52 % of the children with depressed mood according to DSM-IV-TR met the criterion of depressed mood in ICD-10-DCR. We speculate that the criterion that mood be largely uninfluenced by circumstances should not be a requirement in children. This is supported by findings by Patton et al. [15], who found lack of reactivity as defined by the CIDI in only 56 % of their sample of depressed adolescents, and by Williamson et al. [23], who found reactivity present in 41 % of an outpatient sample of depressed children and adolescents. The finding that depressed mood was influenced by circumstances was most prevalent in boys with MDD which is interesting because so far very few gender differences have been detected in the clinical presentation of childhood depression [11]. To our knowledge, no studies show whether the number of core symptoms or the extent to which depressed mood is influenced by circumstances influences aetiology, treatment response or prognosis. Thus, we cannot know which diagnostic system is more valid, and future studies should address these issues.

ICD-10-DCR also included one child in the depressive group who was not included according to DSM-IV-TR. This child had a mild depressive episode. Thus, children with a DSM-IV-TR diagnosis of depressive disorder may on average be slightly more severely affected than a group of children with an ICD-10-DCR diagnosis of depressive disorder, and the certainty with which we can extend results from DSM-IV studies to children with mild depression according to ICD-10-DCR may be limited.

DSM-IV included more children in the ADHD diagnosis than did ICD-10-DCR. Children included in DSM-IV, but not in ICD-10-DCR, all belonged to the subtype hyperactive/impulsive, because ICD-10-DCR does not offer a diagnosis covering this constellation of symptoms. Additionally, it seems insufficient that no specific

diagnostic category exists in ICD-10-DCR for children with the inattentive subtype of ADHD. These children are classified in an ill-defined category which may include very different conditions such as excessive masturbation and thumb-sucking. Accumulating evidence suggests that subtypes of ADHD differ in areas of demographic characteristics, comorbid symptoms, and perhaps treatment response [14], and, therefore, discrepancies in this area are very important when interpreting results from DSM-IV research. The minor difference in the age criterion had direct importance in only one case, but it seems an unnecessary discrepancy that should be eliminated at the next revision of the criteria. ODD criteria differ only slightly and in a way that had little clinical implication. Thus, the two diagnoses are almost interchangeable.

In daily clinical practice, deviations from strict diagnostic criteria occur. This may happen after careful clinical consideration and reflects the fact that diagnoses are man-made categories into which real-life children do not always fit completely. Such deviations can be clinically meaningful. Nevertheless, implementation of evidence-based medicine can be successful only if findings from research trials can be extended to the patients treated. In other words, if a patient does not meet strict DSM-IV-TR criteria for MDD or ADHD, even if he/she meets ICD-10-DCR criteria, clinicians must be aware that the evidence-base for the treatment given is limited.

## Strengths and limitations

To our knowledge, this is the first study to assess the importance of differing diagnostic criteria in DSM-IV-TR and ICD-10-DCR regarding the three DSM-IV-TR diagnoses, MDD, ADHD, and ODD, and their corresponding ICD-10-DCR diagnoses in a relatively large, mixed child psychiatric sample. The children's conditions were thoroughly diagnosed by means of a semistructured diagnostic interview with both parents and child, usually considered the most sensitive way of getting diagnostic information about children [22]. Yet, some limitations must be taken into account when interpreting these results. The age groups examined were limited, and no conclusions can be made about the importance of differing diagnostic criteria in preschool children and in adolescents. The sample size may have been too small for detection of discrepancies occurring rarely. We did not take into consideration the criterion that criteria for attention deficit hyperactivity disorder in ICD-10-DCR must be met in more than one setting. Had this been possible, larger differences between the two diagnostic systems might have been found. The focus of this study was on differences between systems, and we did not attempt to draw conclusions about the validity of diagnoses. The diagnoses were given by one single interviewer which may introduce a single-rater bias. However, measures of interrater reliability based on video recordings suggest that this was not the case.

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## References

1. Ambrosini PJ, Metz C, Prabucki K, Lee JC (1989) Videotape reliability of the third revised edition of the K-SADS. J Am Acad Child Adolesc Psychiatry 28:723–728
2. American Psychiatric Association (2000) Diagnostic and statistical manual of mental disorders DSM-IV-TR. American Psychiatric Association, Washington, DC
3. Barrett ML, Berney TP, Bhate S, Famuyiwa OO, Fundudis T, Kolvin I, Tyrer S (1991) Diagnosing childhood depression who should be interviewed–parent or child? The Newcastle Child Depression Project. Br J Psychiatry (Suppl): 22–27
4. Bertelsen A (2002) Wanted: validation studies on the current diagnostic classifications. Acta Psychiatr Scand 106: 81–82
5. Costello EJ, Angold A, Burns BJ, Stangl DK, Tweed DL, Erkanli A, Worthman CM (1996) The Great Smoky Mountains Study of Youth. Goals, design, methods, and the prevalence of DSM-III-R disorders. Arch Gen Psychiatry 53:1129–1136
6. Edelbrock C, Costello AJ, Dulcan MK, Kalas R, Conover NC (1985) Age differences in the reliability of the psychiatric interview of the child. Child Dev 56:265–275
7. Feinstein C, Blouin AG, Egan J, Conners CK (1984) Depressive symptomatology in a child psychiatric outpatient population: correlations with diagnosis. Compr Psychiatry 25:379–391
8. Hodges K (1993) Structured interviews for assessing children (see comments). J Child Psychol Psychiatry 34:49–68
9. Kaufman J, Birmaher B, Brent D, Rao U, Flynn C, Moreci P, Williamson D, Ryan N (1997) Schedule for Affective Disorders and Schizophrenia for School-Age Children – Present and Lifetime Version (K-SADS-PL): initial reliability and validity data. J Am Acad Child Adolesc Psychiatry 36:980–988
10. Kolvin I, Barrett ML, Bhate SR, Berney TP, Famuyiwa OO, Fundudis T, Tyrer S (1991) The Newcastle Child Depression Project. Diagnosis and classification of depression. Br J Psychiatry (Suppl): 9–21
11. Kovacs M (2001) Gender and the course of major depressive disorder through adolescence in clinically referred youngsters. J Am Acad Child Adolesc Psychiatry 40:1079–1085
12. Landis JR, Koch GG (1977) The measurement of observer agreement for categorical data. Biometrics 33:159–174

13. Mezzich JE (2002) International surveys on the use of ICD-10 and related diagnostic systems. Psychopathology 35:2–3
14. Milich R, Balentine AC, Lynam DR (2001) ADHD Combined Type and ADHD Predominantly Inattentive Type Are Distinct and Unrelated Disorders. Clinical Psychology – Science and Practice 8:463–488
15. Patton GC, Coffey C, Posterino M, Carlin JB, Wolfe R (2000) Adolescent depressive disorder: a population-based study of ICD-10 symptoms. Aust N Z J Psychiatry 34:741–747
16. Paykel ES (2002) Mood disorders: review of current diagnostic systems. Psychopathology 35:94–99
17. Shanee N, Apter A, Weizman A (1997) Psychometric properties of the K-SADS-PL in an Israeli adolescent clinical population. Isr J Psychiatry Relat Sci 34:179–186
18. Sorensen MJ, Nissen JB, Mors O, Thomsen PH (2005) Age and gender differences in depressive symptomatology and comorbidity: an incident sample of psychiatrically admitted children. J Affect Disord 84:85–91
19. Sourander A, Turunen MM (1999) Psychiatric hospital care among children and adolescents in Finland: a nationwide register study. Soc Psychiatry Psychiatr Epidemiol 34:105–110
20. SPSS. Statistical Package for the Social Sciences. 2002. Chicago, SPSS inc. 1989
21. Steinberger K, Schuch B (2002) Classification of obsessive-compulsive disorder in childhood and adolescence. Acta Psychiatr Scand 106:97–102
22. Weiss B, Garber J (2003) Developmental differences in the phenomenology of depression. Dev Psychopathol 15: 403–430
23. Williamson DE, Birmaher B, Brent DA, Balach L, Dahl RE, Ryan ND (2000) Atypical symptoms of depression in a sample of depressed child and adolescent outpatients. J Am Acad Child Adolesc Psychiatry 39:1253–1259
24. World Health Organization (1993) The ICD-10 classification of mental and behavioural disorders: diagnostic criteria for research. World Health Organization, Geneva