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How do we measure psychiatric diagnoses? Implications of the choice of instruments in epilepsy

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ABSTRACT

We evaluated several commonly used screening instruments for the detection of mood disorders, anxiety disorders, and attention-deficit hyperactivity disorder (ADHD). These were compared to a criterion-based standardized questionnaire, the Diagnostic Interview Survey (DIS)-IV, designed to make DSM-IV-TR diagnoses in the community-based study of childhood-onset epilepsy. The DIS-IV was administered to young adult cases with epilepsy at a 15-year follow-up assessment and compared to symptom screens administered at the same visit, and at a previous 9-year assessment. Among cases, the specificity of the DIS-IV ranged from 0.77 to 0.99 and the predictive value of a negative psychiatric diagnosis was similarly high. Sensitivity was lower, ranging from 0 to 0.77, with correspondingly low predictive value of a positive diagnosis. Symptom-based instruments assess current symptom burden and are useful for determining associations with ongoing seizures or quality of life. Criterion-based standardized interviews, such as the DIS-IV, provide psychiatric diagnoses over the lifetime, which is most useful in studies of epilepsy genetics and studies of comorbidities and prognosis of epilepsy.

1. Introduction

Psychiatric disorders are an important comorbidity in epilepsy [1,2]. Instruments used to assess these disorders in epilepsy have included structured and semistructured interviews designed to make a DSM-IV-TR diagnosis, such as the Diagnostic Interview Schedule for Children (DISC) [3], the Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS) [4], and the Structured Clinical Interview for DSM Disorders (SCID) [5]. More commonly, single questions or symptom checklists are used as screening instruments and analyzed as a continuous measure of symptom severity or by applying a cutoff to approximate a DSM diagnosis. Such measures may be used to determine treatment response and remission in clinical trials [6]. Often they are used and interpreted as measures of psychiatric diagnoses; however, this is not their intended use. These instruments include the Child Behavior Checklist (CBCL) [7], the Beck Depression Inventory-II (BDI-II) [8], and the Beck Anxiety Inventory [9].

The DIS-IV [3] is a criterion-based standardized questionnaire designed to make DSM-IV-TR diagnoses. We evaluated the validity of the gold standard DIS-IV DSM-IV-TR diagnoses compared to commonly used symptom scales (e.g., CBCL, BDI-II) and to parental and young adult (YA) questionnaires for ascertaining mood disorders, anxiety disorders, and attention-deficit hyperactivity disorder (ADHD) in the Connecticut Study of Epilepsy. This community-based incidence cohort of childhood-onset epilepsy has been studied using different instruments at two different time points. Because different measures of the same or similar disorders have been used, the study provides an opportunity to compare the yield, sensitivity, and specificity of different methods for assessing psychiatric diagnoses in an epidemiological study and the implications for the choice of method. As our primary goal was to examine the sensitivity and specificity of various screening instruments with respect to the DIS-IV diagnostic questionnaire, we performed an analysis of cases with childhood-onset epilepsy.

2. Methods

Cases identified with incident epilepsy in childhood were recruited from the offices of pediatric neurologists, pediatricians and adult neurologists throughout the state of Connecticut from 1993 to 1997 [10]. The parents were interviewed at baseline. Follow-up calls for further seizures were conducted every 3 to 4 months throughout the course of follow-up. At 8–9 years after initial study entry, cases and their parents were invited to participate in reassessment, including parental questionnaires. About 15 years after recruitment, a YA assessment was performed on cases who attained the age of majority. The YA questionnaire at the 15-year assessment was similar to the 9-year parent questionnaire (Table 1).

At the YA assessment, the DIS-IV was administered to assess lifetime and recent DSM-IV-TR diagnoses of mood disorders, anxiety disorders, and ADHD [3,11]. The DIS-IV was administered by two trained

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Table 1
Instruments used to assess psychiatric disorders at the 9- and 15-year follow-up assessments.

Instrument	Administration	Disorders assessed	Number of cases with questionnaire
Nine-year follow-up assessment			
Parent questionnaire for psychiatric disorders	Trained interviewer	Single questions for: Lifetime depression Lifetime ADHD	238
Child Behavior Checklist	Parent completed	DSM-oriented ADHD DSM-oriented recent depression DSM-oriented recent anxiety	163
Fifteen-year follow-up assessment			
Diagnostic Interview Survey-IV	Trained interviewer administered the structured interview	Lifetime ADHD Lifetime and recent mood disorder Lifetime and recent anxiety disorder	239
Young adult questionnaire for psychiatric disorders	Trained interviewer	Single questions for: Lifetime depression Lifetime anxiety Lifetime ADHD	239
Adult Self-Report from the Achenbach System of Empirically-Based Assessment	Self-completed	DSM-oriented ADHD DSM-oriented recent depression DSM-oriented recent anxiety	225
Beck Depression Inventory-II	Self-completed	Recent depression categorized as: Mild, cutoff: 14–19 Moderate, cutoff: 20–28 Severe, cutoff: ≥29	226
Beck Anxiety Inventory	Self-completed	Recent anxiety categorized as: Mild, cutoff: 8–15 Moderate, cutoff: 16–25 Severe, cutoff: ≥26	226

ADHD — Attention-deficit hyperactivity disorder; DSM — Diagnostic and Statistical Manual.

interviewers. The Beck Depression Inventory (BDI-II) [8], Beck Anxiety Inventory (BAI) [9], and Adult Self-Report (ASR) of the Achenbach System of Empirically-Based Assessment [7] were administered to consenting adult cases with childhood-onset epilepsy (Table 1).

The following DIS-IV diagnoses were considered: ADHD; lifetime and recent anxiety disorder; lifetime and recent mood disorder; and lifetime and recent anxiety disorder or mood disorder (Table 1). Mild, moderate, and severe cutoffs were examined for the BDI-II [6,8] and the BAI [12]. We used the DSM-oriented current diagnoses of affective disorder, anxiety disorder, affective or anxiety disorder, and ADHD for the CBCL [7] and the ASR [7]. The parental questionnaire at the 9-year follow-up queried whether the child had ever had depression and ADHD; the YA questionnaire at the 15-year follow-up queried whether the YA had ever been diagnosed with depression, anxiety, and ADHD.

We studied the cases in order to compare the sensitivity and specificity as well as predictive values of various screens and questionnaires to a criterion-based diagnostic interview in epilepsy. The proportion of cases with each psychiatric disorder was calculated across instruments for the 9-year follow-up and the 15-year follow-up. The DIS-IV diagnoses were compared to the parent questionnaire and DSM-oriented diagnoses on the CBCL at the 9-year follow-up and to the young adult questionnaire, DSM-oriented diagnoses on the ASR and BDI-II cutoffs [13], and the BAI cutoffs [14]. The CBCL DSM-IV categories at the 9-year assessment were compared to the lifetime diagnoses of the DIS-IV because they were indicators of past conditions. The ASR diagnostic categories at the 15-year follow-up were compared to current and lifetime diagnoses on the DIS-IV.

Sensitivity, specificity, and positive predictive values were computed using the DIS-IV diagnoses as the gold standard; exact 95% confidence intervals were also calculated. Sensitivity was defined as the proportion of cases with a diagnosis on the symptom scales or questionnaires that were correctly identified as true positives on the DIS-IV, and specificity as the proportion of cases without a diagnosis on the symptom scales or questionnaires that were correctly identified on the DIS-IV. Positive predictive value (PPV) was defined as the proportion of cases with a psychiatric disorder on the symptom screens or questionnaires that were diagnosed on the DIS-IV, and negative PV as the proportion of cases without a psychiatric disorder on the symptom screens or questionnaires that were not diagnosed on the DIS-IV.

3. Results

These analyses are based on the 239 cases with childhood-onset epilepsy that had been interviewed using the DIS-IV. The median age at epilepsy onset was 6.8 years (IQR: 4.2–9.3). Among the participants, the median age at the DIS-IV interview was 22.2 years (IQR: 20–25.3) and 50.6% were male. Almost all cases (N = 238) with the DIS-IV also had a 9-year parental questionnaire and 163 (68.2%) had parent-completed 9-year CBCL (Table 1). All cases that completed the DIS-IV also completed a 15-year YA questionnaire, 226 (94.6%) completed the BDI-II and the BAI, and 225 (94.1%) completed the ASR.

3.1. Prevalence of mood disorder, anxiety disorder, and ADHD

According to our gold standard measure, the DIS-IV, the lifetime prevalence was 19.7% for mood disorder, 20.2% for anxiety disorder, and 5.4% for ADHD in participants (Table 2). For recent psychiatric disorders, the prevalence was 11.7% for mood disorder and 6.3% for anxiety disorder.

We compared the parent questionnaire for lifetime disorders to the DIS-IV (Table 2). The percentage with mood disorder was lower on the parent questionnaire (12.6% vs. 19.7%). In contrast, the parents reported more ADHD than young adults reported on the DIS-IV (13% vs. 5.4%). When similar comparisons were made between the YA questionnaire and the DIS-IV, the prevalence of mood disorder was similar (18% vs. 19.7%). Compared to the DIS-IV, the prevalence of recent depression was 3.5% using the severe BDI-II cutoff and 5.3% for recent anxiety using the severe BAI cutoff. In a similar comparison, lifetime anxiety disorder was lower (12.6% vs. 20.2%) and lifetime ADHD was higher (17.2% vs. 5.4%) on the YA questionnaire than on the DIS-IV.