

Presenting ADHD Symptoms, Subtypes, and Comorbid Disorders in Clinically Referred Adults With ADHD

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Objective: Despite the increasing presentation of attention-deficit/hyperactivity disorder (ADHD) in adults, many practitioners remain reluctant to assess individuals for ADHD, in part related to the relative lack of data on the presenting symptoms of ADHD in adulthood. Comorbidity among adults with ADHD is also of great interest due to the high rates of psychiatric comorbidity, which can lead to a more persistent ADHD among adults.

Method: We assessed 107 adults with ADHD of both sexes (51% female; mean \pm SD of 37 ± 10.4 years) using structured diagnostic interviews. Using DSM-IV symptoms, we determined DSM-IV subtypes. The study was conducted from 1998 to 2003.

Results: Inattentive symptoms were most frequently endorsed ($>90\%$) in adults with ADHD. Using current symptoms, 62% of adults had the combined subtype, 31% the inattentive only subtype, and 7% the hyperactive/impulsive only subtype. Adults with the combined subtype had relatively more psychiatric comorbidity compared to those with the predominately inattentive subtype. Women were similar to men in the presentation of ADHD.

Conclusion: Adults with ADHD have prominent inattentive symptoms of ADHD, necessitating careful questioning of these symptoms when evaluating these individuals.

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Prospectively collected data suggest that prominent ADHD symptoms persist in approximately one-half of childhood cases into young adulthood⁸ and that 4% to 5% of adults may have ADHD.⁶ Longitudinal studies also show a developmental influence on ADHD symptoms.^{8–10} These data suggest a decay of ADHD symptoms over time with more persistence of the inattentive symptoms of ADHD relative to the hyperactive/impulsive symptoms.^{8–11} In support of this notion, using *Diagnostic and Statistical Manual of Mental Disorders*, Third Edition, Revised (DSM-III-R) criteria, we previously reported higher levels of inattentive symptoms compared to hyperactive/impulsive symptoms in a sample of adults with ADHD.¹² However, those data were derived from DSM-III-R, necessitating replication using *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition (DSM-IV) criteria and subtypes to better understand the current symptomatic presentation of adults with ADHD.

The literature also suggests that children with psychiatric comorbidities such as conduct disorder may be at higher risk for the persistence of specific subtypes of ADHD,^{10,13} highlighting the important influence of co-occurring psychiatric disorders on the presentation of ADHD in older age groups. Additionally, sex differences may also affect the presentation of ADHD over time. For example, studies of girls with ADHD suggest lower rates of conduct disorder relative to boys with ADHD^{14,15} that may translate into less hyperactivity and impulsivity in adulthood. However, the effect of sex on the symptom presentation of ADHD in adults remains understudied.

Given that the diagnosis of ADHD is established through clinical history,^{16–18} a better understanding of manifested symptoms in adults with ADHD has the potential to increase the diagnostic precision of clinicians. To better understand the symptom profile of adults with ADHD, we systematically assessed DSM-IV ADHD symptoms in a large group of adults with the disorder. We secondarily evaluated the influence of psychiatric comorbidity, sex, and age on the presentation of ADHD in adults. Based on the literature,¹² we hypothesized that inattentive symptoms would be more prominent relative to hyperactive/impulsive symptoms in a sample of adults with childhood-onset and persistent ADHD. We further hypothesized that psychiatric comorbidity would be more common with the combined subtype relative to the inattentive subtype of ADHD.

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Adults with attention-deficit/hyperactivity disorder (ADHD) are increasingly presenting for evaluation and treatment of their disorder, reflective of the clinical awareness of the chronicity of the disorder^{1–3} and identification of the disorder in adults with other psychiatric disorders.^{4–6} Despite this awareness, many practitioners remain reluctant to assess and subsequently treat individuals for ADHD⁷ in part because of the relative lack of data on the presenting symptoms of ADHD in adulthood.

FOR CLINICAL USE

- ◆ Presenting symptoms in adults with attention-deficit/hyperactivity disorder (ADHD) were more frequently inattentive than hyperactive/impulsive symptoms.
- ◆ The most common subtype of ADHD in clinically referred adults was the combined subtype.
- ◆ Adults with the combined subtype of ADHD had significantly higher lifetime rates of conduct disorder, bipolar disorder, and psychosis compared to those with the inattentive subtype.

METHOD

Subjects

Men and women between the ages of 18 and 55 years were eligible to become probands for the study. Exclusion criteria were deafness, blindness, psychosis, inadequate command of the English language, or a full-scale IQ less than 80 as measured by the IQ estimated from the block design and vocabulary subtests of the Wechsler Adult Intelligence Scales-Revised.³⁸ No ethnic or racial group was excluded. We recruited potential probands with ADHD through advertisements in the greater Boston area and referrals to adult ADHD clinics. The institutional review board at Massachusetts General Hospital approved the study, and subjects provided signed informed consent.

Assessment Measures

Trained lay interviewers, blind to ascertainment status, interviewed all adults with the Structured Clinical Interview for *DSM-IV* (SCID)¹⁹ and modules from the Schedule for Affective Disorders and Schizophrenia for School-Age Children–Epidemiologic Version (K-SADS-E).^{20,39,40} When we asked questions about childhood disorders, the subjects were first queried about childhood symptoms, and if they were present, they were asked about continuation of these symptoms into adulthood and the emergence of others. Age at onset was defined as the first emergence of impairing symptoms. Before interviewing for the study, interviewers completed a 4-month training program that included mastery of the instruments, learning about *DSM-IV* criteria, watching training tapes, observing interviews performed by experienced raters, rating several subjects under the supervision of the project coordinator, and completing practice interviews. Throughout the study, they were supervised by board-certified child and adolescent psychiatrists or licensed psychologists. This supervision included weekly meetings and additional consultations, as needed.

During the study, all interviews were audiotaped for random quality control assessments. Final diagnostic assignment was based on the structured psychiatric interview. Initial diagnoses were prepared by the study interviewers and were then reviewed by a diagnostic committee of board-certified child and adolescent psychiatrists or licensed psychologists. The diagnostic committee was blind to each

subject's ascertainment group and diagnoses were made for 2 points in time: lifetime and current (past month). The interviewers had been instructed to take extensive notes about the symptoms for each disorder. These notes and the structured interview data were reviewed by the diagnostic committee so that the committee could make a best-estimate diagnosis, as described by Leckman et al.²¹ Definite diagnoses were assigned to subjects who met all diagnostic criteria. Diagnoses were considered definite only if a consensus was achieved that criteria were met to a degree that would be considered clinically meaningful. By "clinically meaningful," we mean that the data collected from the structured interview indicated that the diagnosis should be a clinical concern because of the nature of the symptoms, the associated impairment, and the coherence of the clinical picture.

We computed κ coefficients of agreement by having experienced board-certified child and adult psychiatrists and licensed clinical psychologists diagnose subjects from audiotaped interviews. On the basis of 500 assessments from interviews of children and adults, the median κ coefficient was 0.98. κ coefficients for individual diagnoses were ADHD (0.88), conduct disorder (1.00), major depression (1.00), mania (0.95), separation anxiety (1.00), agoraphobia (1.00), panic (0.95), substance use disorder (1.00), and tics/Tourette's disorder (0.89).

Statistical Analysis

We conducted analyses on probands who had a current diagnosis of ADHD. Categorical data were analyzed using Pearson χ^2 test and when necessary, Fisher exact test. *t* Tests and 1-way analysis of variance were used to analyze continuous variables, and the Wilcoxon rank sum and the Kruskal-Wallis tests were used to analyze continuous variables that were not normally distributed. An α level of .05 was used to assert statistical significance; all statistical tests were 2-tailed. We calculated all statistics using Stata 10.0 (StataCorp LP, College Station, Texas).

RESULTS

In this sample, there were 107 adults with ADHD of which 49% ($n = 52$) were male and 51% ($n = 55$) were female. The mean \pm SD age of the sample was 37 ± 10.4 years. Men were significantly younger than women (men, 34 years,

Table 1. Demographic Characteristics of Adults With ADHD (N = 107)

Characteristic	Value
SES, mean \pm SD ^a	2.0 \pm 0.9
Age, y, mean \pm SD	37.0 \pm 10.4
Gender, n (%)	
Male	52 (49)
Current subtypes, n (%)	
Inattentive	33 (31)
Hyperactive	8 (7)
Combined	66 (62)

^an = 98 (9 missing values); SES measured using the Hollingshead Four Factor Index of Social Status.

Abbreviations: ADHD = attention-deficit/hyperactivity disorder, SES = socioeconomic status.

women, 39 years; $t = 2.8$, $P < .01$). The mean socioeconomic status of the sample, as measured by the Hollingshead Four Factor Index of Social Status,²² was 2.0 ± 0.9 (Table 1). There were no differences in socioeconomic status between sexes or across the subtypes of ADHD.

This was a highly comorbid group of adults: 8% had no psychiatric comorbidity, 10% had a lifetime history of 1 comorbid psychiatric disorder, 14% had 2, 15% had 3, and 53% had 4 or more psychiatric comorbidities. When asked about the level of overall impairment related directly to their ADHD symptoms in the past, 40% ($n = 43$) of our ADHD sample endorsed severe impairment, 53% ($n = 57$) moderate impairment, and 7% ($n = 7$) mild impairment. Likewise, when asked about the level of impairment caused by their ADHD symptoms within the past month, 22% ($n = 24$) endorsed severe impairment, 50% ($n = 54$) moderate impairment, and 26% ($n = 28$) mild impairment.

When specific *DSM-IV* ADHD symptoms were examined, inattentive symptoms were more frequently endorsed overall than hyperactive symptoms (Figure 1). The most commonly reported inattentive symptoms were "being easily distracted," "difficulty sustaining attention," and "difficulty with sustained mental effort." The most commonly reported hyperactive symptoms were "blurts out answers," "interrupts or intrudes," and "fidgets." Sixty-two percent ($n = 66$) of adults had the combined subtype, 31% ($n = 33$) had the inattentive subtype, and 7% ($n = 8$) had the hyperactive/impulsive subtype. There were no differences between men and women in the total number of endorsed inattentive or hyperactive/impulsive symptoms. However, when each symptom was examined individually, females were significantly more likely to endorse the inattentive symptom of "loses things" ($\chi^2 = 7.5$, $P < .01$). When the sample was split into 2 groups at the median age of 38 years, there were no differences between age groups in the total number or type of endorsed inattentive and hyperactive/impulsive symptoms.

Adults with a combined type of ADHD had significantly higher rates of lifetime conduct disorder, bipolar disorder, and psychosis compared to those with the inattentive and the hyperactive/impulsive subtypes (Table 2). From the

post hoc analysis, we determined that adults with the combined type had a significantly greater prevalence of conduct disorder and bipolar disorder when compared to only the inattentive subtype. In regard to academic functioning, there were no significant differences in the number of individuals who repeated a grade, took a special class, and had extra help across the ADHD subtypes.

We further examined our data to determine whether sex was related to psychiatric comorbidity. Men had significantly higher lifetime rates of comorbid conduct disorder and alcohol abuse ($P < .01$), while women had significantly higher rates of comorbid dysthymia, panic disorder ($P < .05$), agoraphobia, simple phobia, and generalized anxiety disorder ($P < .01$).

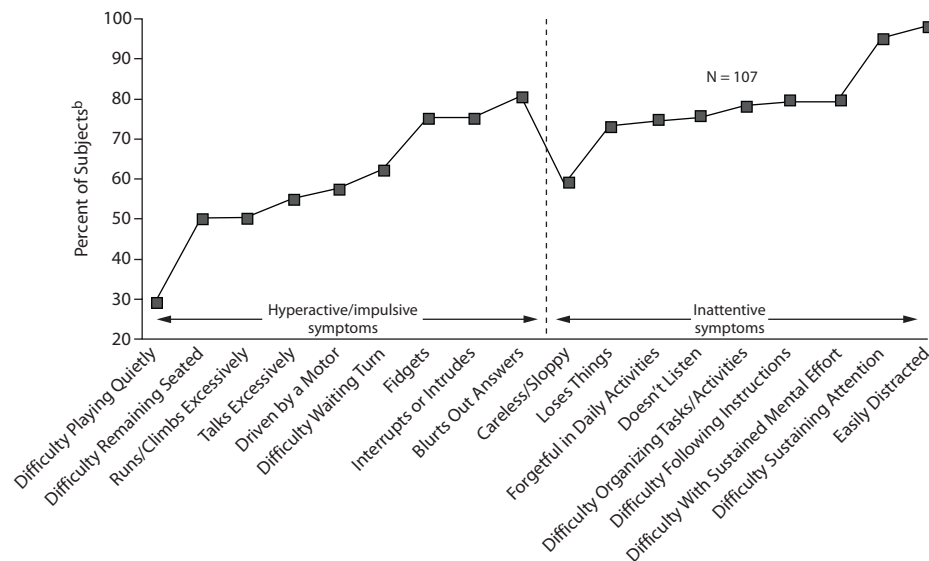
DISCUSSION

The results of the current study indicate that adults with ADHD have prominent symptoms of inattention. On the basis of *DSM-IV* criteria, 93% of adults with ADHD had either the predominately inattentive or combined subtypes—indicative of prominent behavioral symptoms of inattention in adults. Psychiatric comorbidity was more commonly found in subjects with hyperactivity/impulsivity as part of their adult presentation.

Similar to our results, studies of the prevalence of *DSM-IV* subtypes in clinically referred children and adolescents with ADHD in the *DSM-IV* field trials²³ show that the combined type is the most prevalent type of ADHD (66%), followed by the inattentive (33%) and the hyperactive/impulsive types (8%). Moreover, our results are similar to community-based studies in children reporting high rates of the inattentive subtype (5.4%), followed by the combined (3.6%) and hyperactive/impulsive (2.4%) types.²⁴ In our sample, the overwhelming majority of adults with ADHD endorsed prominent inattentive symptoms that were subsumed in either the inattentive or combined subtypes (93%). Our findings are consistent with aggregate studies in which the majority of children and adolescents met criteria for a subtype of ADHD with inattention.²³ That inattentive symptoms predominate also support findings of impaired neuropsychological functioning, working memory, and executive functioning in adults with ADHD.²⁵

The high rates of symptoms of inattention relative to hyperactivity/impulsivity are consistent with prospectively derived data in clinically and epidemiologically based samples of children, adolescents, and young adults with ADHD in which decreases in the hyperactive and impulsive symptom clusters compared to the inattentive clusters were evident over time.^{8–10,26–29}

We found that psychiatric comorbidity was more common in context to the combined and inattentive-only subtypes. It may be that psychiatric comorbidity is a marker of more severe ADHD as exemplified by more symptoms reflected in the combined subtype.³⁰ Of interest, high rates

Figure 1. Presenting *DSM-IV* Symptoms in a Clinical Sample of Adults With ADHD^a

^aEndorsed symptoms were reported by adults with ADHD through structured clinical interviews.

^bData are presented as percentage of subjects endorsing each *DSM-IV*-specific symptom of ADHD.

Abbreviations: ADHD = attention-deficit/hyperactivity disorder, *DSM-IV* = *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition.

Table 2. Comorbid Disorders in Adults With ADHD Stratified by ADHD Subtype (N = 107)

Disorders	Combined Type n = 66 (62%), n (%)	Inattentive Type n = 33 (31%), n (%)	Hyperactive Type n = 8 (7%), n (%)	Overall Significance ^a	P Value (combined vs inattentive)
Disruptive disorders					
Conduct disorder	24 (36)*	4 (12)	0 (0)	0.006	.01
Antisocial disorder	15 (23)	2 (6)	1 (13)	0.081	.04
Oppositional disorder	30 (45)	9 (27)	2 (25)	0.177	.08
Mood disorders					
Major depressive disorder (severe)	28 (42)	4 (12)	3 (38)	0.060	.03
Dysthymia	18 (27)	5 (15)	0 (0)	0.144	.18
Bipolar (combined I and II)	15 (23)*	2 (6)**	3 (38)	0.031	.04
Psychosis	10 (15)	0 (0)	2 (25)	0.017	.01
Anxiety disorders					
Multiple (> 2) anxiety disorders	28 (42)	9 (27)	3 (38)	0.393	.14
Panic disorder	18 (27)	4 (12)	1 (13)	0.198	.09
Simple phobia	13 (20)	7 (21)	4 (50)	0.182	.86
Social phobia	26 (39)	9 (27)	3 (38)	0.476	.23
Separation anxiety	8 (12)	2 (6)	1 (13)	0.590	.29
Generalized anxiety disorder	19 (29)	6 (18)	2 (25)	0.490	.25
Agoraphobia	13 (20)	3 (9)	0 (0)	0.269	.18
Obsessive-compulsive disorder	9 (14)	3 (9)	1 (13)	0.896	.38
Avoidance disorder	3 (5)	1 (3)	0 (0)	1.000	.59
Posttraumatic stress disorder	9 (14)	3 (9)	0 (0)	0.701	.38
Substance use disorders					
Alcohol abuse	41 (62)	16 (48)	4 (50)	0.370	.20
Alcohol dependence	21 (32)	10 (30)	3 (38)	0.897	.88
Substance abuse	30 (45)	13 (39)	4 (50)	0.782	.57
Substance dependence	20 (30)	4 (12)	3 (38)	0.071	.047
Any abuse or dependence	48 (73)	23 (70)	6 (75)	0.941	.75
Eating disorders					
Anorexia	2 (3)	0 (0)	1 (13)	0.149	.44
Bulimia	2 (3)	1 (3)	1 (13)	0.348	.71
Academic functioning					
Repeated grade	15 (23)	5 (15)	0 (0)	0.277	.38
Special class	11 (17)	3 (9)	2 (25)	0.343	.24
Extra help	34 (52)	14 (42)	4 (50)	0.684	.39

^adf = 2.

* $P < .05$ vs inattentive subtype by Pearson χ^2 .

** $P < .05$ vs hyperactive subtype by Pearson χ^2 .

Abbreviation: ADHD = attention-deficit/hyperactivity disorder.

of psychiatric comorbidity have been reported in adults with ADHD.^{6,31,32} Psychiatric comorbidity has also been shown to be associated with more persistent ADHD¹³ and with prominent hyperactive/impulsive symptoms in adults with ADHD.³³ More specifically, in the current study, adults with a combined type of ADHD had significantly higher rates of lifetime conduct disorder, bipolar disorder, and psychosis compared to those with the inattentive subtype, mirroring findings from a separate dataset showing more hyperactivity and impulsivity in adults with ADHD who had comorbid bipolar disorder relative to those without bipolar disorder and ADHD.³³

Given that this sample was largely derived from clinical referral, and because both clinically and epidemiologically derived samples of adults with ADHD have been shown to have high rates of co-occurring psychopathology,^{6,31,32} it is difficult to disentangle whether higher specific symptom clusters as well as higher symptom counts are associated with comorbidity, or if comorbidity skews symptom counts. Further analysis should be done on specific endorsed symptoms in longitudinal studies. These aggregate data suggest the need to carefully examine adults with more pronounced symptoms of ADHD for other psychiatric comorbidity. Moreover, psychiatric comorbidity with ADHD may predict a more persistent form of ADHD.³³

Interestingly, we found no sex differences in ADHD symptoms. In the sample with equal sex distribution, both sexes had high rates of attentional dysfunction relative to hyperactivity/impulsivity. Moreover, similar to previous reports in adults,³⁴ we found that men with ADHD had higher lifetime comorbidity with conduct disorder and alcohol abuse relative to women with ADHD. Conversely, women had higher rates of comorbid dysthymia, panic disorder, agoraphobia, simple phobia, and generalized anxiety disorder compared to men. These findings are consistent with data derived from longitudinal studies of girls growing up, which highlight more similarities than dissimilarities in the core ADHD and general and cognitive functioning between the sexes.³⁵ However, notable differences in specific comorbidities between the sexes remain.

The results of this study need to be tempered against their substantial limitations. The findings are based in part on observations from both a nonreferred and clinically referred population and, therefore, may not generalize to all adults with ADHD. Also, because we assessed adults who met only 6 of the 9 child-based ADHD diagnostic criteria, our sample represents a more severe group of ADHD adults and may not generalize to all adults with ADHD. The symptoms reported by these adults may not have been entirely accurate given the retrospective recall required of past symptoms. However, previous studies have documented the validity of using retrospective recall in the diagnosis of adults with ADHD.^{16,18,36,37}

Despite these limitations, findings from the current study support previous work with separate samples that

showed that the vast majority of adults with ADHD present prominent symptoms of inattention, independent of sex. Compared to adults with the inattentive subtype of ADHD, those with the combined subtype had higher rates of psychiatric comorbidity. Given the high prevalence of ADHD occurring in mental health and substance abuse domains, more emphasis on the inattentive aspects of ADHD needs to be highlighted when making the diagnosis.

Disclosure of off-label usage: The authors have determined that, to the best of their knowledge, no investigational information about pharmaceutical agents that is outside US Food and Drug Administration–approved labeling has been presented in this article.

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For the CME Posttest for this article, see pages 1614–1615.
