

ABSTRACT

The goal of this study was to characterize the functional outcomes of young adult women with a childhood diagnosis of ADHD. The study included 64 young women from a larger longitudinal study of ADHD. Thirty-seven of the 64 were young women who met DSM criteria for ADHD in childhood, while the remaining 27 comparison participants did not meet ADHD criteria. Self- and parent-reports were collected on a number of domains including parent, peer, and romantic relationships, psychopathology, academic achievement, and job performance. Significant differences emerged suggesting that girls with a childhood history of ADHD continue to experience difficulties in daily life in young adulthood. For example, girls with a childhood diagnosis of ADHD reported more conflict with their mothers, being involved in fewer romantic relationships, and more depressive symptoms. However, differences did not emerge in all domains. For example, no differences were found in reports of job functioning and self-reported ADHD symptomatology. In addition, parent reports yielded greater differences than self-reports. The findings of this study are consistent with other studies of ADHD in females (Hinshaw et al., 2006; Biederman et al., 2006) which suggest continued impairment for girls with ADHD after initial diagnosis.

INTRODUCTION

ADHD is defined on the basis of developmentally inappropriate levels of inattention, impulsivity, and motor activity that cause significant impairment in critical domains of functioning. ADHD is estimated to affect 3-7% of school-age children (American Psychiatric Association, 2000), but the majority of the children that have been diagnosed with ADHD have been boys. A range of male-to-female prevalence ratios have been reported, from 2:1 (Szatmari, 1992) to as large as 9:1 (American Psychiatric Association, 1994). Thus, the majority of what is known about ADHD has come from samples of boys, while thorough study of girls with ADHD has been neglected. Girls have been shown to meet DSM diagnostic criteria for ADHD and manifest related impairment, but little is known about what happens to girls with ADHD after initial diagnosis.

Only two studies thus far have attempted to characterize the developmental course of ADHD in females (Hinshaw et al., 2006; Biederman et al., 2006). These studies provide evidence that girls with ADHD in childhood continue to experience difficulties later in life, including psychopathology, particularly mood and externalizing disorders, and a broad range of impairment in domains such as social relationships and school achievement. However, these studies have provided limited information about young adult outcomes specifically.

Young adulthood is a time when life course trajectories begin to take shape. ADHD may impede successful and timely adoption of early adult milestones for women. For example, women with ADHD may have difficulty completing higher education, finding employment, and maintaining relationships. Some may bear children prematurely. The goal of this study is to characterize young adult women with and without a childhood diagnosis of ADHD on a variety of domains of general functioning including psychopathology, social functioning, occupational outcomes, and academic achievement. It is anticipated that young adult women with a history of ADHD will experience more impairment in these domains when compared with girls without a history of ADHD, but the extent of this impairment is unknown.

PARTICIPANTS

Probands. 38 girls were recruited from a pool of 364 children meeting DSM-III-R or DSM-IV ADHD diagnosis at the ADD Clinic and Western Psychiatric Institute and Clinic (WPIC) in Pittsburgh, PA, during the years 1987-1996. All proband girls participated in the Summer Treatment Program for children with ADHD, an 8-week intervention that included behavior modification, parent training, and psychoactive medication trials where indicated (Pelham & Hoza, 1996). At follow-up, one proband was not able to be contacted, thus 37 proband girls were included for the current study.

Non-ADHD participants. 27 girls without ADHD, who were among 240 PALS participants without ADHD, were included for comparison. PALS non-ADHD participants were recruited in the Pittsburgh area between 1999 and 2001 for their demographic similarity to the probands at follow-up. Individuals who met DSM-III-R criteria for ADHD (presence of 8 or more symptoms) either currently or historically were excluded. Participants with subthreshold ADHD symptomatology or other psychiatric disorders were retained.

Exclusionary criteria included a full-scale IQ < 80, a history of seizures or other neurological problems, and/or a history of pervasive developmental disorder, schizophrenia, or other psychotic or organic mental disorder.

Table 1
Demographic characteristics of the sample

	ADHD	non-ADHD	
N	37	27	
Age at follow-up Wave 2 (M, SD)	19.43 (3.36)	19.07 (3.17)	ns
Monthly family income (M, SD)	1.97 (1.66)	2.30 (1.30)	ns
Caucasian (%)	83.8%	77.8%	ns
Parents Married (%)	66.7%	84.0%	ns
Maternal report (%)	88.9%	96.2%	ns

PROCEDURE

Annual follow-up interviews were conducted in the ADD Program office. Interviewers were not blind to group status, but they were trained to avoid bias in data collection. Many of the questionnaires were completed privately by participants to help minimize interviewer contamination. For this study, data were taken from the second annual wave of assessments, using both self and parent reports when available.

To test for differences between proband and comparison girls, a series of nonparametric Mann-Whitney U tests were run. U tests provide a test for group differences which is not biased by outlying scores. Effect sizes (Cohen's *d*) were also calculated. The potential for experimentwise error may be increased with the relatively large amount of tests run, but because few studies on the young adult outcomes of females with ADHD exist, this study is exploratory in nature.

MEASURES

Internalizing Behavior. The Center for Epidemiologic Studies Scale (CES-D, Radloff, 1977) was used to assess self-reports of depressive symptomatology. Total scores range from 0-60, with higher scores indicating greater levels of depression. The Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986) measures the degree to which an individual believes anxiety experiences are related to negative consequences, and is related to generalized anxiety symptoms. Scores range from 0-64 with higher scores indicating greater severity.

Externalizing Behavior. The Disruptive Behavior Disorders Rating Scale (DBD; Pelham, Gnagy, Greenslade & Milich, 1992) and the Adult ADHD Scale (Barkley & Murphy, 1998) assessed parent and self-reported ADHD symptoms. The DBD was completed by for females less than 18 years of age and their mothers, and the Adult ADHD Scale was completed by individuals aged 18 and older.

Interpersonal Relationships. The Conflict Behavior Questionnaire (CBQ; Prinz, Foster, Kent, & O'Leary, 1979) assessed girls' relationships with their parents. It is a 20-item measure with higher scores indicative of a more problematic relationship. The number of close friends by parent and self report was collected, and self reports of the number of romantic relationships and average length of romantic relationships were assessed using items from a measure developed for this study.

Academic Performance. Scores on the Wide Range Achievement Test (WRAT; Jastak & Jastak, 1976) were used to measure reading recognition, spelling, and arithmetic computation.

Job Performance. Participants were asked questions about the total number of jobs they have ever had, the longest amount of time employed, and their highest hourly wage.

General Daily Life Functioning. The Impairment Rating Scale (IRS; Pelham, Fabiano, & Massetti, 2005) was used to assess impairment in specific domains as well as overall. Parent and self ratings were collected. Scores range from 0-6 with items of 3 or higher indicative of significant levels of impairment (Fabiano et al., 2006).

Table 2

Median of Outcome Scores, Significance Level of Mann-Whitney U Tests, and Cohen's d Effect Sizes

	ADHD Median	Comparison Median	p-value	E.S.
Internalizing and Externalizing Psychopathology				
CES-D (self-report)	14.50	9.00	.050	0.51
Mean of Hyperactivity/Impulsivity symptoms (parent-report)	0.78	0.11	.000	1.46
Mean of inattention symptoms (parent-report)	1.11	0.22	.000	1.80
Relationship with Parents				
CBQ (self-report about mom)	2.10	1.65	.018	0.58
CBQ (parent-report)	2.63	1.68	.000	1.04
Peer Relationships				
# of close friends (parent-report)	2.00	3.00	.034	0.60
Romantic Relationships				
# of relationships (self-report)	0.00	2.00	.011	0.66
Achievement				
Spelling Standard Score	98.00	108.00	.001	0.99
Arithmetic Standard Score	87.00	104.00	.001	0.89
Reading Standard Score	97.00	110.00	.001	0.94
IRS				
Self-report				
Academic progress	0.50	0.00	.040	0.74
Family in general	0.00	0.00	.018	0.73
Parent IRS				
Relationships with peers	3.00	0.00	.000	1.47
Relationships with siblings	3.00	0.00	.000	1.98
Relationships with parents	3.00	0.00	.000	1.45
Academic progress	3.00	0.00	.000	1.85
Work performance	1.00	0.00	.001	1.25
Self-esteem	3.00	0.00	.000	1.85
Family in general	2.00	0.00	.000	1.49
Overall severity/need for treatment	3.00	0.00	.000	1.72

Note: Significant differences were not found on the following self-report measures: ASI, mean number of ADHD symptoms, CBQ (about father), # of close friends, average length of romantic relationships, total number of jobs, highest daily wage, total months employed, and IRS items about relationships with peers, siblings, parents, teachers, coworkers, supervisors, romantic partners, self-esteem, work performance, and overall need for treatment. For parent-reported measures, no significant differences emerged on the romantic relationship item of the IRS.

DISCUSSION

The goal of this study was to characterize young women with and without childhood ADHD on a range of functional domains. Few studies have specifically focused on studying such outcomes in young adulthood.

Consistent with previous follow-up studies of girlhood ADHD (Hinshaw, Owens, Sami, & Fargeon, 2006; Biederman et al., 2006), the present study found evidence of considerable impairment for young women with childhood ADHD.

Females with childhood ADHD reported more depressive symptoms, conflict with their mothers, fewer romantic relationships, lower achievement scores, and general difficulty academically and with family. In addition, parent reports revealed that girlhood ADHD predicted more ADHD symptoms, fewer close friends, and more difficulty in relationships with peers, siblings, parents, school, work, self-esteem, and overall by young adulthood.

It has been reported that adolescents with ADHD do not report accurately on their ADHD symptoms, but their reports on social domains are more informative (Smith, Pelham, Gnagy, Molina, & Evans, 2000). Consistent with this line of research self-reports of ADHD symptoms in this study did not reveal any differences, while parent reports suggest that differences do exist. Inconsistencies were also apparent in social domains in this study. For example, when asked to report their number of close friends, proband girls reported significantly fewer friends, a likely index of peer impairment. However, differences were not found on the IRS item asking about problems with peers. Perhaps when questions are worded in such a way that probands are asked if they have problems in a specific area, they are less likely to endorse that item than if they were asked questions specifically about their absolute status ("do you have a problem making friends?" versus "how many friends do you have?"). If this is the case, it is consistent with research on the positive illusory bias (Owens & Hoza, 2000), suggesting that some children with ADHD overestimate their competence in domains in which they have the most difficulty.

The expected differences that did not emerge are also of note. For example, no differences emerged in measures of job performance. It does not yet appear that girls with a history of ADHD experience employment difficulties. However, the importance of holding a job in young adulthood can vary depending upon several factors, including whether or not an individual is currently attending school or pursuing higher education. Moreover, employment in this age range (which includes some adolescents) is naturally transitory and often part-time. Thus, in young adulthood it may appear that both groups hold similar level jobs, but given the academic difficulties of girls with ADHD reported in this study, girls in the comparison group may be more likely to pursue jobs that require higher education and skill. In successive years when participants are older, differences may emerge and be more meaningful.

Limitations:

The small N reduced power to detect group differences. Small sample sizes are not uncommon in the current state of female ADHD research due to the gender inequality in prevalence. The use of unbiased nonparametric tests and reporting of effect sizes increases confidence that in a larger sample of girls, clear group differences would emerge between proband and comparison girls.

The girls with childhood ADHD were from a clinic sample. These findings may not generalize to all females with ADHD who do not present for treatment. Clinic-referred status of the proband girls suggests that they displayed more severe ADHD symptomatology in childhood, more characteristic of males (Gaub & Carlson, 1997), while community samples of girls with ADHD reveal patterns of symptoms and impairment unique from boys, including fewer externalizing symptoms, greater inattention and more intellectual impairment.

Summary:

Almost the entire field of ADHD research has been built upon models developed using predominantly male samples. Thus the research agenda for understanding ADHD in females is sizable. Longitudinal studies like the current study help to inform researchers and clinicians about the patterns of impairment in women with ADHD and highlight domains for intervention.

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