

Prevalence of Neurocognitive Deficits in Adults with Untreated ADHD: Implications for the Workplace

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Introduction

It is estimated that approximately 4% of the adult workforce has Attention Deficit Hyperactivity Disorder.

ADHD is associated, both directly and indirectly, with an average of 35 days annually of lost work performance.

Adults with ADHD in the workforce are less likely to maintain full-time employment, have lower ranking occupations, have increased absenteeism, and change jobs more often.

The impact on workplace performance has financial implications on companies and the economy.

The loss of workforce productivity as a result of ADHD is estimated to cost the United States' economy billions of dollars annually (Biederman & Faraone, 2006; Birnbaum et al., 2005).

A significant proportion of adults with ADHD have neurocognitive difficulties and perform more poorly on neuropsychological tests, including measures of attention and concentration, verbal learning, and executive functioning.

These deficits can be subtle, can often go undetected, and can have a direct impact on workplace performance.

A better understanding of the cognitive deficits associated with adult ADHD is needed.

Purpose: To illustrate a methodology for identifying frank neurocognitive deficits in adults with untreated ADHD using a 30-minute computerized neuropsychological battery.

Participants

105 adults with ADHD as their primary diagnosis.

Average age = 32.3 years (SD=12.9); average education = 11.5 years (SD=6.1); 63.5% male; and 85.7% Caucasian.

Occupations included: Professional/Technical (41.5%), Student (41.5%), Managerial/Office (7.3%), Skilled Labour (4.9%), Clerical/Sales (2.4%), Unskilled Labour (1.2%), and Not Working/Retired (1.2%).

All patients were medication-free at the time of their evaluation, which included computerized neurocognitive testing using CNS Vital Signs.

Measure

CNS Vital Signs is comprised of seven common neuropsychological measures, including verbal and visual memory, finger tapping, symbol digit coding, the Stroop test, a shifting attention test, and a continuous performance test.

The battery generates 15 primary scores, which are used to calculate 5 domain scores (Memory, Psychomotor Speed, Reaction Time, Cognitive Flexibility, and Complex Attention) and a summary score (Neurocognition Index).

Analyses

The base rates of low domain scores were calculated by using four cutoff scores that might be routinely used in clinical practice, including: (a) more than 1 standard deviation (SD) below the mean (i.e., < 85), (b) below the 10th percentile (i.e., < 81), (c) at or below the 5th percentile (i.e., ≤ 76), and (d) more than 2 SDs below the mean (i.e., < 70).

Results

Mean performance on the 5 domain scores for the untreated ADHD group were typically 1/3 to 2/3 of a standard deviation (SD) below the mean (Memory = 89.7, SD = 21.2; Psychomotor Speed = 94.5, SD = 18.8; Reaction Time = 90.4, SD = 25.6; Cognitive Flexibility = 92.3, SD = 25.6; Complex Attention = 89.1, SD = 27.4).

The base rates of low scores are presented in Table 1.

Nearly 63% of this sample had at least one low domain score (i.e., more than 1 SD below the mean). Previous research with healthy control samples has demonstrated that having 2 or more CNS Vital Signs domain scores at or below the 5th percentile likely represents cognitive impairment.

When using two or more scores below the 5th percentile as the cutoff for frank neurocognitive impairment, 28.6% of the adults with ADHD scored in this range.

Table 1. Base rates of low CNS Vital Signs domain scores in adults with ADHD.

Number of Low Scores	< 1 SD		< 10 th %ile		≤ 5 th %ile		< 2 SDs		Number of Low Scores
	%	C%	%	C%	%	C%	%	C%	
5	7.6	7.6	6.7	6.7	4.8	4.8	1.0	1.0	5
4	8.6	16.2	3.8	10.5	3.8	8.6	4.8	5.8	4
3	13.3	29.5	13.3	23.8	7.6	16.2	8.6	14.4	3
2	9.5	39.0	12.4	36.2	12.4	28.6	7.6	22.0	2
1	23.8	62.8	21.9	58.1	27.6	56.2	19.0	41.0	1
0	37.1	100	41.9	100	43.8	100	59.0	100	0

Note: There are slight variations due to rounding. Base rates are based on the simultaneous analysis of the 5 domain scores, including Memory, Psychomotor Speed, Reaction Time, Cognitive Flexibility, and Complex Attention.

Conclusions

A significant minority of adults with untreated ADHD have frank neurocognitive impairment on this rapid computerized battery.

Using a our previously established guideline of 2 or more scores at or below the 5th percentile, 28.6% of adults with untreated ADHD were identified as having frank impairment.

These deficits can have a negative impact on workplace functioning, especially when ADHD has not been properly diagnosed and treated.