

## ORIGINAL RESEARCH

# The Adult ADHD Self-Report Scale for Screening for Adult Attention Deficit–Hyperactivity Disorder (ADHD)

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**Background:** Adult attention deficit–hyperactivity disorder (ADHD) is underdiagnosed in the primary care setting despite 3% to 6% of adults having ADHD-like symptoms. The Adult ADHD Self-Report Scale-V1.1 (ASRS-V1.1) is a validated, 6-question screen for adult ADHD. Our purpose was to analyze this tool for evaluating patients in a busy primary care setting.

**Methods:** The ASRS-V1.1 was administered to patients in 8 busy primary care practices. All with a positive score and a random sample of those with a negative screening score were asked to complete the Conners' Adult ADHD Rating Scale Self Report–Short Version. Each was administered within the clinic setting during the same session. Sensitivity, specificity, and positive/negative predictive values were calculated. Data were evaluated for site-specific differences.

**Results:** It took an average of 54.3 seconds (range, 22–252 seconds) to complete the ASRS-V1.1. There was an inconsistency-adjusted sensitivity of 1.0, a specificity of 0.71, a positive predictive value of 0.52, and a negative predictive value of 1.0. No site-specific differences were found.

**Conclusions:** Because of its ease of use, short time to administer, high sensitivity, and moderate specificity, the ASRS-V1.1 is an effective adult ADHD screening to guide further evaluations for ADHD. (J Am Board Fam Med 2012;25:847–853.)

**Keywords:** Adult Attention Deficit and Hyperactivity Disorder, Mental Health Screening Instruments, PBRN, Practice-Based Research

Although it was initially thought that attention deficit–hyperactivity disorder (ADHD) remits in all children,<sup>1</sup> ADHD may persist into adulthood 10% to 66% of the time.<sup>2,3</sup> Surveys of adults ages 18 to 44 years showed that 4.4% of adults meet the criteria to be diagnosed with ADHD,<sup>4</sup> and 3% to 6% of adults have ADHD-like symptoms that interfere with daily life.<sup>5</sup>

These issues often present themselves at work. Employers have said that employees with adult ADHD have lower levels of work performance, a lack of independent skills, impaired task completion, and poorer relationships with supervisors.<sup>6</sup> This poor work performance can lead to higher rates of unemployment, frequent job changes, and lower socioeconomic status.<sup>7</sup> The hyperactive component of ADHD may masquerade as an employee overworking or an abnormal competitive drive when compared with coworkers.<sup>8</sup>

Despite the prevalence in adults, ADHD symptoms are often less disruptive than in children due to the development of elaborate coping mechanisms.<sup>9,10</sup> These coping mechanisms include adjusting their environment to suit them, relying on others for assistance, and choosing careers that accommodate their symptoms.<sup>11,12</sup>

In addition to elaborate coping mechanisms, associated comorbidities complicate the diagnosis of adult ADHD.<sup>5</sup> ADHD is prone to coexist with

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mood and anxiety disorders,<sup>2</sup> and 77% to 87% of ADHD adults have at least 1 other comorbid psychiatric disorder.<sup>13,14</sup>

The diagnostic criteria for ADHD were designed for children and do not completely apply to adults.<sup>15</sup> The *Diagnostic and Statistical Manual of Mental Disorders, Fourth edition (DSM-IV)* has divided ADHD into 3 subtypes: ADHD predominantly inattentive type, ADHD predominantly hyperactive-impulsive type, and ADHD combined type. These 3 types have the same core features: symptoms dating back to childhood, impairment in  $\geq 2$  settings (home, work, school, social), and moderate severity ratings for  $\geq 6$  of 9 hyperactivity/impulsivity symptoms.

These criteria have been criticized for not respecting the developmental changes that happen as a person ages.<sup>16</sup> The criteria were created based on children<sup>17</sup> without validation in adults,<sup>18</sup> have been called too restrictive for the adult population,<sup>19</sup> and leave out symptoms such as procrastination, poor motivation, and time-management difficulties.<sup>15</sup> One study found that the *DSM-IV* criteria did not adequately distinguish between adults with ADHD and adults without ADHD,<sup>20</sup> and only approximately one third of adults diagnosed with ADHD actually meet the *DSM-IV* ADHD criteria.<sup>21</sup>

Many primary care physicians have had little to no training in diagnosing adult ADHD. In undiagnosed patients with ADHD, the time to diagnosis was longer for those treated by primary care physicians than psychiatrists.<sup>9</sup> The rate of treatment of ADHD in adults is much lower than its prevalence<sup>22</sup>; only 11% of respondents in a 2006 survey who met the criteria for adult ADHD had been treated in the previous 12 months.<sup>4</sup>

The reasons for the underdiagnosis of adult ADHD in primary care settings are numerous. First, most screening tools are time-consuming and impede office productivity. Any tool that impedes office productivity will not be fully endorsed in the primary care setting. Second, the time involved with screening may cause patients to be hesitant to be screened. Many tests take  $>90$  minutes to complete and include clinical interviews and ratings scales. Finally, some primary care physicians may be uncomfortable with administering an adult ADHD test and treating the disorder.<sup>23</sup>

The purpose of this study was to test the efficacy of an adult ADHD screening protocol. The first objective of this study was to test a time-efficient

and effective adult ADHD screen to be used in a primary care setting. This screen is the 6-question Adult ADHD Self-Report Scale-V1.1 (ASRS-V1.1) from the World Health Organization Composite International Diagnostic Interview.<sup>24</sup> The second objective was to evaluate how willing individuals with a positive ASRS-V1.1 would be to participate in a more in-depth ADHD assessment tool using the Conners' Adult ADHD Rating Scale Self Report-Short Version (CAARS-S:S), a 26-question survey.

The information gained from this study estimated the prevalence of adult ADHD in a primary care setting, the ease of using the ASRS-V1.1 as a screen for adult ADHD in a primary care setting, and the ability of the ASRS-V1.1 to adequately screen for adult ADHD. These findings will guide future research in how to implement screening in primary care settings and in how to efficiently and effectively diagnose adult ADHD.

## Methods

Two tools were used for this study. The first is the 6-question ASRS-V1.1 from the World Health Organization Composite International Diagnostic Interview.<sup>24</sup> The ASRS-V1.1 examines symptoms described by the *DSM-IV* as being commonly seen in adult ADHD. Its first 4 questions address the inattention portion of ADHD, and its final 2 address the hyperactivity portion.<sup>25</sup> This screening tool has performed well in studies with a sensitivity of 68.7%, specificity 99.5%, and positive predictive value (PPV) of 89.3%.<sup>26</sup> Internal consistency (Cronbach  $\alpha$ ) ranges between 0.63 and 0.72 and has a test-retest reliability of 0.58 to 0.77. There is good concordance with clinician diagnosis with area under the receiver operator curve of 0.90.<sup>27</sup>

The second tool, CAARS-S:S, is a Likert scale-based, 26-question questionnaire used to rate a patient's current functioning ability. The CAARS-S:S has reported internal consistency (Cronbach  $\alpha$ ) between 0.80 to 0.89 and has a test-retest reliability of 0.85 to 0.91.<sup>28</sup> The CAARS-S:S is reported to take approximately 10 minutes to administer and 10 minutes to score. The Conners' Adult ADHD Rating Scale, a 66-item assessment from which the CAARS-S:S was derived, has a diagnostic sensitivity of 82%, specificity of 87%, and PPV of 85%. In a busy clinical primary care practice, this test is reported to take 15 minutes to administer and 10

minutes to score the results.<sup>29</sup> The 5 factors of the CAARS-S:S are CAARS-S:S A-Inattention/Memory Problems, CAARS-S:S B-Hyperactivity/Restlessness, CAARS-S:S C-Impulsivity/Emotional Lability, CAARS-S:S D-Problems with Self-Concept, and CAARS-S:S E-ADHD Index, an overall ADHD score.

The sample came from 8 primary care practices that represent inner city, suburban, and rural settings.

Adults, ages 18 to 65 years, able to read and speak English, without a current diagnosis of adult ADHD, and who presented for an appointment were asked to participate by completing the ASRS-V1.1. Patients presenting to the clinic that day were assigned the number of their appointment slot (the first appointment of the day was 1, the second appointment was 2, etc). A randomized list of numbers was generated and patients corresponding to the random number generated by the list were asked to participate. (For example, if the first number on the randomized list of numbers was 5, the fifth patient presenting to their appointment was asked to participate.) The patients were approached in the waiting room after registration and asked to participate in the study.

Those who accepted were taken to an examination room where the ASRS-V1.1 was administered. The ASRS-V1.1 was immediately scored, and the participant was notified of the result if he or she wished. If the patient tested positive on the ASRS-V1.1, he or she was given information explaining the results and recommended to seek follow-up with their primary care provider. Those with a positive ASRS-V1.1 screen were asked to participate further by taking the CAARS-S:S. Also, a randomly selected group of negative screens was

asked to take the CAARS-S:S for comparison purposes.

In addition to measuring the results of the screens, demographic information including the participant's name, age, sex, and time it took to take each screen was collected. Sensitivity and specificity were estimated by contingency table analysis, and comparisons among the clinics were evaluated using the Fisher exact test. The data were analyzed using SAS 9.1 (Cary, NC).

## Results

Of the 217 patients who were asked to take the ASRS-V1.1, 200 accepted (92%; see Table 1). Reasons given by patients who declined to take the ASRS-V1.1 included feeling too sick, not having enough time, and not wanting to know if he or she had ADHD. Of the 200 who took the ASRS-V1.1, 130 were female (65%). The average age of participants was 40.1 years, and the average time it took to complete the ASRS was 54.3 seconds (range, 22–252 seconds).

Thirty participants tested positive on the ASRS-V1.1 (15%), and all were asked to take the CAARS-S:S. Twenty-five of the 30 agreed to take the CAARS-S:S (83%; Table 2). Of the 171 who tested negative on the ASRS-V1.1, 35 were randomly asked to take the CAARS-S:S, and 30 accepted (86%; Table 3). The average time it took to take the CAARS-S:S was 166.9 seconds (range, 93–253 seconds).

Fifty-five participants completed both the ASRS-V1.1 and also the CAARS-S:S. Of the 25 patients who tested positive on the ASRS-V1.1 and took the CAARS-S:S, 12 (48%) tested positive on the CAARS-S:S E-ADHD Index, a score from the best set of items identifying adults at risk for ADHD. Of

**Table 1. Adult ADHD Self-Report Scale-V1.1 (ASRS-V1.1) Participation by Clinic Number**

Clinic Number	Total Asked to Take ASRS	Total Yes to ASRS	Total No to ASRS	Participation Rate for ASRS
1	23	20	3	0.87
2	140	128	12	0.91
3	17	16	1	0.94
4	4	4	0	1.00
5	8	8	0	1.00
6	2	2	0	1.00
7	3	3	0	1.00
8	20	19	1	0.95
Total	217	200	17	0.92

**Table 2. Conners' Adult ADHD Rating Scale Self Report–Short Version (CAARS-S:S) with Positive Adult ADHD Self-Report Scale-V1.1 (ASRS-V1.1) Participation by Clinic**

Clinic Number	Total Asked to Take CAARS-S:S with Positive ASRS-V1.1	Total Yes to CAARS-S:S with Positive ASRS-V1.1	Total No to CAARS-S:S with Positive ASRS-V1.1	Participation Rate for CAARS-S:S with Positive ASRS-V1.1
1	5	3	2	0.60
2	19	17	2	0.89
4	1	1	0	1.00
5	1	1	0	1.00
7	2	1	1	0.50
8	2	2	0	1.00
Totals	30	25	5	0.83

the 30 participants with a negative ASRS-V1.1, 30 tested negative and 1 tested positive on the CAARS-S:S E-ADHD Index. Thus, 12 of the 13 (92%) participants who tested positive on the CAARS-S:S E-ADHD Index tested positive on the ASRS-V1.1 (Table 4).

Using a positive CAARS-S:S E-ADHD Index as an indicator of ADHD, the ASRS-V1.1 was found to have a sensitivity of 0.92 in detecting ADHD. The specificity was 0.69. Within our sample, the PPV was 0.48, and the negative predictive value was 0.97. Adjusting for a reported population prevalence of 4.4%,<sup>4</sup> the PPV was 0.12, and the negative predictive value was 0.99. Table 5 displays the number of participants who screened positive for each subtype.

No statistical difference was found ( $P = .33$ ) among the clinic sites with respect to a positive or negative ASRS-V1.1 result, but statistical significance was found among individual clinics with respect to a positive test on the CAARS-S:S E-ADHD Index ( $P = .007$ ).

A score of  $\geq 8$  on the CAARS-S:S inconsistency index indicates an inconsistent response. Based on

similar questions within the CAARS-S:S, 5 of the 55 (9%) participants who took the CAARS-S:S had inconsistent responses. Of those 5, 2 scored positive on the ASRS-V1.1. Excluding those inconsistent scores, the adjusted sensitivity of the ASRS-V1.1 within our population was 1.0, the adjusted specificity was 0.71, the adjusted PPV was 0.52, and the adjusted negative predictive value was 1.0.

## Discussion

Like in other studies,<sup>25,26</sup> the ASRS-V1.1 was found to be an effective tool to evaluate for adult ADHD in a primary care setting. The high participation rate of 92% for the ASRS-V1.1 showed our population's willingness to do this screen. The short time it took, an average of 54.3 seconds, makes it an attractive tool to use in a primary care setting. Physicians would be able to use this screen to quickly determine if further workup for adult ADHD is needed in the course of a busy office visit.

The ASRS-V1.1 had 30 positive screens of the 200 participants (15%). Twelve of those 30 positive

**Table 3. Conners' Adult ADHD Rating Scale Self Report–Short Version (CAARS-S:S) with Negative Adult ADHD Self-Report Scale-V1.1 (ASRS-V1.1) Participation by Clinic**

Clinic Number	Total Asked to Take CAARS-S:S with Negative ASRS-V1.1	Total Yes to CAARS-S:S with Negative ASRS-V1.1	Total No to CAARS-S:S with Negative ASRS-V1.1	Participation Rate for CAARS-S:S with Negative ASRS-V1.1
1	3	2	1	0.67
2	22	20	2	0.91
3	8	6	2	0.75
4	1	1	0	1.00
6	1	1	0	1.00
Totals	35	30	5	0.86



**Table 4. Distribution of Positive Screening Tests for Attention Deficit–Hyperactivity Disorder (ADHD)**

	CAARS-S:S Positive	CAARS-S:S Negative	
ASRS-V1.1 positive	12	13	25
ASRS-V1.1 negative	1	29	30
	13	42	55

CAARS-S:S, Conners' Adult ADHD Rating Scale Self Report–Short Version; ASRS-V1.1, Adult ADHD Self-Report Scale–V1.1.

screens were also positive on the CAARS-S:S, a 6% prevalence rate in our sample. This prevalence is similar to other estimates of the prevalence of adult ADHD.<sup>4,5</sup>

Possible explanations for the greater number of positive screenings with the ASRS-V1.1 versus the CAARS-S:S vary. The small sample size could have been a factor in the results. Comorbidities could also have affected the results; this study did not seek to identify those possible comorbidities. The lower specificity of the ASRS-V1.1 in our population compared with the reported higher specificity of the CAARS tools also would predict more positive tests with the ASRS-V1.1.

Other possibilities include that patients sincerely thought they had ADHD and thus wanted to be tested. With the increased media attention to ADHD, awareness of its symptoms has greatly increased. Although many patients may think they have ADHD, studies have shown that only one third to one half of self-referrals actually met the criteria for diagnosis.<sup>30</sup>

Once adjusted for inconsistency score in the CAARS-S:S, the ASRS-V1.1 showed a sensitivity of 1.0 and a specificity of 0.71. The high sensitivity suggests the ASRS-V1.1 rarely misses adults with ADHD. The moderately high specificity and negative predictive value of 0.99 suggest that the ASRS-V1.1 is successful at not identifying someone with adult ADHD if he or she does not have it.

This study showed differing results than a well-known study using the ASRS-V1.1. Kessler and colleagues<sup>26</sup> found that the ASRS-V1.1 had a sensitivity of 0.687 and a specificity of 0.995, suggesting the ASRS-V1.1 is better served at ruling in disease rather than ruling it out.

The differing results between this study and Kessler and colleagues' study may be due to some shortcomings that the authors mention in their

article. The clinical interview used in their study to validate the ASRS-V1.1 was completed before the administration of the ASRS-V1.1 screen, allowing patients to possibly skew the survey due to heightened awareness of any symptoms they may have. Although the clinical interview used in their study is an accepted tool for diagnosing adult ADHD, it has yet to be validated in a large-scale study. Also, the sample sizes in both studies were small; this study had a sample size of 200 and Kessler and colleagues had a sample size of 154, which could also contribute to the dissimilarities in findings.

A study in Spain using patients with substance use disorders found the sensitivity and specificity of the ASRS-V1.1 to be 0.875 and 0.686, respectively.<sup>31</sup> Although these results are based on patients with a comorbidity of substance use, their sensitivity and specificity are similar to the results of this study.

Although this study showed that the ASRS-V1.1 would be an effective adult ADHD screen in a primary care setting, it also showed some of the weaknesses of the ASRS-V1.1. Although its length of 6 questions is useful in its short time to complete, it does not rule out other medical conditions and comorbidities that affect the diagnosis of adult ADHD. Physicians routinely do not treat ADHD until the other mood, medical, and substance abuse disorders are controlled. Furthermore, the ASRS-V1.1 offers no way to assess for inconsistencies or malingering.

This study showed the ASRS-V1.1 to be an effective screen for adult ADHD in a primary care setting. With its ease to complete and brief time to administer, the ASRS-V1.1 would not impede office productivity. Patients were willing to complete this screening tool and were able to do so expeditiously. With its high sensitivity and moderately high specificity, the ASRS-V1.1 would rarely miss adults with ADHD and would be successful at

**Table 5. Frequency of Positive Attention Deficit–Hyperactivity Disorder (ADHD) Subtypes A–D and Index on the Conners' Adult ADHD Rating Scale Self Report–Short Version (CAARS-S:S)**

CAARS-S:S A—Inattention/memory problems	13
CAARS-S:S B—Hyperactivity/restlessness	15
CAARS-S:S C—Impulsivity/emotional lability	11
CAARS-S:S D—Problems with self-concept	5
CAARS-S:S E—ADHD Index	13

rarely identifying someone with adult ADHD if he or she does not have it. Individuals who screen positive for ADHD using this screening tool should have a complete history and clinical interview to confirm the diagnosis and to rule out other psychiatric or nonpsychiatric conditions before negotiating a treatment regimen. Overall, the ASRS-V1.1 is an effective tool to determine if further medical and psychiatric workup is needed in an adult presenting with ADHD-like symptoms.

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