



Original article



Sex differences in the efficacy of cognitive behavioral therapy for adults with attention-deficit/hyperactivity disorder

Juan Jesús Crespín^{a,b,d}, Montse Corrales^{a,b,c,d}, Vanesa Richarte^{a,b,c,d},
 Gemma Parramón^{a,b,c,d}, Santiago Biel^a, Ferran Mestres^a, Carolina Ramos-Sayalero^{b,c},
 Pol Ibáñez^b, Gemma Nieva^{a,b,c,d}, Carla Torrent^{c,e,f}, Derek Clougher^{c,e,f,g},
 Christian Fadeuilhe^{a,b,c,d,*}, Silvia Amoretti^{a,b,c,d,†},
 Josep Antoni Ramos-Quiroga^{a,b,c,d,†,*}

^a Psychiatry, Mental Health and Addictions Group, Vall d'Hebron Research Institute (VHIR), Instituto de Investigación Sanitaria Acreditado Instituto de Investigación - Hospital Universitario Vall d'Hebron (IR-HUVH), Barcelona, Catalonia, Spain

^b Group of Psychiatry, Mental Health and Addiction, Vall d'Hebron Research Institute (VHIR), Barcelona, Spain

^c Centro de Investigación Biomédica en Red de Salud Mental, Instituto de Salud Carlos III, Madrid, Spain

^d Department of Psychiatry and Forensic Medicine, Universitat Autònoma de Barcelona, Barcelona, Spain

^e Bipolar and Depressive Disorders Unit, Hospital Clínic de Barcelona; Institut de Neurociències (UBNeuro); Fundació Clínic-Institut d'Investigacions Biomèdiques August Pi I Sunyer (IDIBAPS); CIBERSAM, ISCIII, Barcelona, Spain

^f Departament de Medicina, Facultat de Medicina i Ciències de la Salut, Universitat de Barcelona (UB), c. Casanova, 143, 08036, Barcelona, Spain

^g BIOARABA, Department Psychiatry. Hospital Universitario de Alava. CIBERSAM. University of the Basque Country, Vitoria, Spain

ARTICLE INFO

Keywords:

ADHD
 Cognitive behavioral therapy
 Sex differences
 Symptom severity

ABSTRACT

Background and objectives: Cognitive Behavioral Therapy (CBT) is an effective adjunctive treatment for Attention-Deficit/Hyperactivity Disorder (ADHD). This study examined sex differences in the efficacy of a brief 6-session CBT program versus a traditional 12-session format, combined with stable pharmacotherapy, in adults with ADHD.

Methods: A total of 81 adults (58 % male; 41.27 ± 9.26 years) were randomly assigned to 6- or 12-session CBT. ADHD symptoms, psychopathology, and functioning were assessed at baseline, post-treatment, and 3- and 6-month follow-up. Mixed-effects models analyzed interactions between time, treatment group, and sex.

Results: At baseline, females exhibited greater symptom severity ($p = 0.019$), higher inattention ($p < 0.001$), and more pronounced impairments ($p = 0.004$). CBT led to significant clinical improvements regardless of sex. A significant time-by-sex interaction emerged for inattention (CAARS:O:L, $p = 0.043$), although it did not remain significant after adjusting for baseline severity. Regarding time × group × sex interactions, females in the 6-session group showed smaller reductions in clinical severity during follow-up (CGI-S, $p = 0.047$); however, this effect was no longer statistically significant after controlling for baseline ADHD severity. Findings should be interpreted with caution given the limited female sample at follow-up and the significant influence of initial symptom burden on long-term trajectories.

Conclusions: CBT improves ADHD symptoms and related impairments in adults, with comparable overall benefits across sexes. Treatment response follow-up differences were better explained by baseline severity and treatment intensity rather than sex-specific differences.

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a prevalent

neurodevelopmental condition characterized by persistent symptoms of inattention, hyperactivity, and impulsivity, which significantly disrupt an individual's daily functioning and overall quality of life.¹ Although

* Corresponding authors at: Psychiatric Department, Hospital Universitari Vall d'Hebron, Passeig Vall d'Hebron 119-129, 08035 Barcelona, Spain.

E-mail addresses: christian.fadeuilhe@vallhebron.cat (C. Fadeuilhe), antoni.ramos@vallhebron.cat (J.A. Ramos-Quiroga).

† Joint last authors: Silvia Amoretti and Josep Antoni Ramos-Quiroga.

ADHD has traditionally been studied in children, it is now increasingly recognized as a lifelong condition, with symptoms that often persist into adulthood. Approximately 2.8 % of the global adult population is affected by ADHD.^{2,3} The disorder is commonly associated with a range of comorbidities, including anxiety, depression, and substance use disorders, which complicate its treatment and contribute to significant impairments in various areas of functioning, including social, academic, and occupational domains.^{4,5}

Clinical guidelines recommend a multimodal treatment approach for adults with ADHD, integrating pharmacological, psychological, and educational interventions.⁶ While stimulant medications remain the cornerstone of ADHD treatment, cognitive behavioral therapy (CBT) has emerged as the most supported non-pharmacological intervention for managing ADHD symptoms and their comorbidities in adults.^{7,8}

CBT focuses on modifying dysfunctional thoughts and behaviors, improving organizational skills, and developing adaptive coping strategies, thereby addressing both cognitive and emotional challenges inherent in ADHD.^{9,10} CBT has proven effective in treating ADHD in adult, with studies showing that it can even be more beneficial than supportive therapies or waiting lists in reducing symptoms. A meta-analysis by Philipson et al.¹¹ found that CBT combined with medication significantly improved symptoms of inattention and global clinical status. Additionally, Knouse and Safren⁹ emphasized that CBT provides specific strategies to address functional deficits related to organization and time management in adults with ADHD. Improving these functional deficits ensures that CBT goes beyond addressing the core symptoms of ADHD; improvements in organization and time management can lead to reductions in anxiety, particularly in relation to procrastination and stress.⁷ Accordingly, CBT targets both the central symptoms of ADHD as well as patients' quality of life highlighting it as a valuable intervention for adults with ADHD.

Despite its established efficacy, numerous studies have employed traditional 12-session programs. Limited research exploring the potential benefits of shorter interventions exists, which could be significant in the context of the growing demand for cost-effective and accessible treatments. As such, there is growing interest in developing abbreviated CBT protocols that maintain therapeutic effectiveness while reducing the time and financial burden on both patients and healthcare systems. Moreover, shorter programs may contribute to an increase in therapeutic adherence.¹² A recent randomized controlled trial (RCT) by Corrales et al.¹³ compared a novel 6-session CBT program with the traditional 12-session program and found that the shorter intervention was equally effective in reducing ADHD symptoms and improving functional outcomes. Further, significant improvements in ADHD severity, comorbidities, and functional impairments were observed in both programs post-treatment and were sustained at 3- and 6-month follow-ups.

Sex differences in ADHD presentation, comorbidity, and treatment response have gained increasing attention.¹⁴ Evidence suggests that females with ADHD are more likely to exhibit inattentiveness, as well as experience higher levels of internalizing symptoms such as anxiety, depression, somatic symptoms, and bulimia.¹⁴⁻¹⁶ Moreover, females present with greater functional impairments compared to males.¹⁷ In contrast, males are more likely to experience externalizing disorders, including substance or alcohol abuse, antisocial personality disorder, and conduct disorder.¹⁴ This symptom divergence contributes to a notable gender gap in ADHD recognition and diagnosis. While recent studies report a wide range in male-to-female ratios in adult ADHD—from 3:1¹⁸ to 1:1¹⁹—underdiagnosis in women remains a concern. Females are less frequently identified because their symptoms are less overt and often manifest as disorganization, emotional dysregulation, or anxiety, leading many to first seek treatment for mood disorders rather than ADHD.^{20,21} Also, studies show that parents and educators are less likely to recognize ADHD in girls, even when symptom severity matches that of boys.^{22,23} This diagnostic bias may stem from a limited understanding of the female ADHD phenotype and from diagnostic criteria

that are more attuned to males with ADHD.^{24,25} Importantly, recent registry-based studies have confirmed that women with ADHD are diagnosed on average four years later than men.²⁶ Furthermore, and regarding pharmacological treatment, a meta-analysis by Kok et al.²⁷ highlights significant sex differences in the prescription, usage, and effectiveness of both stimulant and non-stimulant ADHD pharmacotherapy, raising important questions about whether sex also influences the efficacy of non-pharmacological treatments, such as CBT, an area where existing research is still limited. Taken together, these findings underscore the urgent need for sex-sensitive approaches to assessment and intervention.

Consequently, the overarching aim of this exploratory study was to examine whether CBT, in combination with pharmacological treatment, is equally effective for both sexes. Specifically, we sought to identify any sex-specific treatment effects regarding ADHD core symptoms, clinical severity, and functional impairment that could guide future clinical practice.

Material and methods

Sample

This study is a subanalysis based on data from a RCT by Corrales et al.,¹³ conducted in the Adult ADHD Program at the Hospital Universitari Vall d'Hebron, Barcelona, Spain. It was approved by the Clinical Research Ethics Committee of the aforementioned hospital and registered at ClinicalTrials.gov (NCT04588181). Sampled patients voluntarily agreed to participate in the study without receiving any financial compensation.

Inclusion criteria were (i) between 18 and 65 years old, (ii) met the DSM-5-TR diagnostic criteria for ADHD, (iii) present ADHD symptoms (scores ≥ 24 on the ADHD Rating Scale (ADHD-RS)²⁸ and > 3 on the Clinical Global Impression Severity Scale (CGI-S))²⁹ (iv) received combined treatment meaning they had maintained an ongoing pharmacological treatment for ADHD for at least two months prior to enrollment and (v) no changes to current pharmacological treatment were allowed during the study and follow-up periods.

Exclusion criteria included (i) an IQ below 85, (ii) autism spectrum disorder, bipolar disorders, schizophrenia or other psychotic disorders, substance use disorders, or personality disorders according to DSM-5-TR, (iii) participants receiving concurrent psychological treatments.

Eighty-one participants were eligible for the study (mean age \pm SD: 41.27 \pm 9.26 years). The final sample was composed of 47 men (58 %) and 34 women (42 %), with 25 participants (30.9 %) being single, 43 (53.1 %) married, and 13 (16 %) divorced. In terms of educational level, 36 participants (44 %) had completed compulsory education and 45 (55.6 %) post-compulsory education. Regarding employment status, 63 individuals (77.8 %) were employed, 9 (11.1 %) unemployed, 5 (6.2 %) studying, and 4 (4.9 %) were either retired or on medical leave.

30 participants (37 %) presented with the inattentive presentation and 51 (63 %) with the combined presentation. Pharmacological treatment included methylphenidate (45.7 %), lisdexamfetamine (38.3 %), and atomoxetine (16 %). Comorbidities included anxiety (24.7 %) and mood disorders (30.9 %), with 33.3 % of the sample receiving concomitant pharmacological treatment for comorbid conditions.

Participants were randomly assigned to either a 6-session or a 12-session adjunctive CBT program, both delivered in a group-based format. Randomization was conducted using Research Randomizer software (Version 4.0) by an independent researcher not involved in the clinical assessment of participants.³⁰

The sample size was calculated using the GRANMO Sample Size Calculator version 7.12. Based on previous studies,¹² an expected effect size of 0.50, a power of 80 %, and a significance level of 0.05 indicates a required sample of 45 participants per intervention group (6-session vs. 12-session CBT). This calculation was performed for the primary aim of the trial. Subgroup analyses (e.g., by sex) were exploratory and not

specifically powered.

Assessments

The clinical diagnosis of ADHD was made by senior psychiatrists and psychologists according to the criteria established by the DSM-5-TR.¹ The ADHD diagnosis was evaluated and confirmed using the Conners' Adult ADHD Diagnostic Interview for DSM-IV (CAADID)³¹ and the Diagnostic Interview for ADHD in Adults (DIVA 2.0).³² For these interviews, we followed the Spanish clinical validations conducted by Ramos-Quiroga et al.^{31,32}

The Wender Utah Rating Scale (WURS)³³ was used to assess a range of childhood symptoms and behaviors indicative of ADHD. We employed the Spanish abbreviated version validated by Rodríguez-Jiménez et al.³⁴ This 25-item scale has shown excellent internal consistency in the Spanish population, with a reported Cronbach's alpha (α) of 0.92.

The ADHD Rating Scale (ADHD-RS)²⁸ was used to evaluate the frequency and severity of ADHD symptoms. We utilized the Spanish clinical version validated by Richarte et al.²⁸ This scale consists of 18 items based on DSM criteria and has demonstrated high internal consistency, with a Cronbach's alpha of 0.94.

The Clinical Global Impression-Severity (CGI-S) scale²⁹ was used to assess the clinician's objective perception of the patient's global illness severity. We followed the original criteria described by Guy.²⁹ As it is a single-item instrument scored from 1 to 7, Cronbach's alpha is not applicable; however, its clinical validity and sensitivity to change are widely established.

The Conners' Adult ADHD Rating Scales – Long Version (CAARS)³⁵ was used to evaluate ADHD symptomatology through two components: the self-report scale (CAARS-S:L) and the observer-rated scale (CAARS-O:L). We utilized the Catalan adaptation validated by Amador-Campos et al.³⁶ This version presented adequate evidence of validity, with reliability scores (Cronbach's alpha) of 0.75 for the self-report form and .78 for the observer form.

The Beck Depression Inventory II (BDI-II)³⁷ was employed to assess depressive symptoms. We used the Spanish adaptation by Sanz et al.,³⁸ which has demonstrated high internal consistency in clinical samples, with a Cronbach's alpha of 0.89.

The State-Trait Anxiety Inventory (STAI)³⁹ was used to evaluate state anxiety. We utilized the Spanish psychometric update provided by Guillén-Riquelme and Buela-Casal.⁴⁰ The state-anxiety subscale has shown excellent reliability in Spanish populations, with a Cronbach's alpha of 0.94.

Psychosocial functioning was assessed using the Functioning Assessment Short Test (FAST).^{41,42} We utilized the Spanish version validated by Rosa et al.⁴¹ The scale has demonstrated high internal consistency in Spanish samples, with a Cronbach's alpha of 0.91.

Participants' disability and health was evaluated with the World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0).⁴³ We employed the Spanish version validated by Amoretti et al.⁴⁴ in adults with ADHD. The instrument has shown good internal consistency in ADHD, with a Cronbach's alpha of 0.89 for the global scale.

Interventions

The 12-session CBT program was based on the protocol developed by Safren et al.,⁴⁵ utilizing the officially translated and culturally adapted Spanish version. This program includes 90-minute weekly group sessions targeting core difficulties associated with ADHD. The sessions covered strategies such as psychoeducation for ADHD, organizational and planning skills (time, tasks, and space management), managing distractibility and attention deficits, cognitive strategies for emotional regulation, techniques for impulsivity control, addressing procrastination, and relapse prevention. The final session focused on consolidating learned skills. The 6-session CBT program was created by Corrales et al.¹³

as a native Spanish-language adaptation specifically designed for the local clinical context. It is a condensed version of the traditional protocol, designed to deliver the core therapeutic components (psychoeducation, organizational and planning skills, managing distractibility, emotional regulation strategies, impulsivity control techniques, and fostering motivation for change alongside relapse prevention) within a shorter timeframe while maintaining the same session frequency (weekly) and duration (90 min). For detailed information regarding the sessions see Corrales et al.¹³ Both interventions were facilitated by experienced psychologists with over five years of clinical practice, all of whom were trained in CBT for ADHD and participated in the ADHD specialization program at Vall d'Hebron Hospital. To further guarantee treatment fidelity and the correct application of the protocols, a dedicated clinical psychology team monitored the implementation process under the clinical supervision of senior specialists from Vall d'Hebron Hospital.

Statistical analysis

A comprehensive descriptive analysis of all variables was performed, including their percentages, means, and standard deviations. Sex differences were evaluated by analyzing continuous variables using the Student's *t*-test and categorical variables using the chi-square test. Effect sizes were calculated using Cohen's *d* for continuous variables and Cramér's *V* for nominal variables. Interactions between time, treatment group, and sex were analyzed using mixed-effects models, with random intercepts for participants to account for repeated measures. Given the limited sample size and attrition at follow-up, interaction and subgroup analyses were considered exploratory. Statistical significance was set at $p \leq 0.05$, and effect sizes were reported when applicable. All analyses were performed using SPSS version 26 for Windows.

Results

Sex differences in baseline characteristics

Sex differences in baseline characteristics are summarized in [Table 1](#). A significant sex difference was observed in employment status indicating higher employment rates among males ($t = 5.79, p = 0.017$). Females exhibited higher ADHD symptom severity, as measured by the ADHD-RS, compared to males ($t = 2.34, p = 0.019$) and were prescribed significantly higher current medication doses ($t = -2.89, p = 0.005$). In the self-report scale of the CAARS (CAARS-S:L), females reported higher scores than males on the inattention subscale ($t = 2.61, p = 0.011$) and the ADHD Global Index ($t = 2.42, p = 0.018$). Similarly, in the observer-rated scale (CAARS-O:L), females also received higher scores on the inattention subscale ($t = 3.77, p < 0.001$) and the ADHD Global Index ($t = 2.78, p = 0.007$).

Additionally, females reported higher levels of functional impairment as measured by the FAST ($t = 2.98, p = 0.004$) and greater overall psychopathology as assessed by the CGI-S ($t = 2.32, p = 0.023$). Notably, no significant sex differences were observed in other psychological measures often associated with sex disparities, such as the BDI-II ($p = 0.359$) or the STAI ($p = 0.679$).

Efficacy of intervention across sexes and CBT format (pre-post analysis)

[Table 2](#) presents the results of the GLM analyses examining the pre-post efficacy of 6-session and 12-session CBT interventions on ADHD symptom severity and related measures across sexes.

Effect of time

Significant improvements were observed across all primary and secondary outcomes from pre- to post-treatment. ADHD symptom severity, as measured by the ADHD-RS, showed substantial reductions (F

Table 1
Sex differences in baseline characteristics.

	Females (n=34)	Males (n=47)	t	p or χ^2	Effect size
Age (mean±SD)	42.06 ± 8.49	40.70 ± 9.84	0.65	0.519	0.15
Educational level: university (n, %)	11 (32.4)	12 (25.5)	0.45	0.335	0.07
Marital status: single (n, %)	12 (35.3)	13 (27.7)	0.54	0.311	0.08
Living arrangements: alone (n, %)	4 (11.8)	4 (8.5)	0.24	0.451	0.05
Employment status: Employed (n, %)	22 (64.7)	41 (87.2)	5.79	0.017	0.27
Current dosage pharmacological treatment ADHD (mean±SD)	46.32 ± 15.72	57.79 ± 18.81	-2.89	0.005	0.66
WURS (mean±SD)	52.45 ± 15.95	54.11 ± 15.07	-0.46	0.645	0.10
ADHD-RS (mean±SD)	36.74 ± 6.43	33.15 ± 6.80	2.34	0.019	0.54
CAARS-S:L (mean±SD)					
<i>Inattention</i>	75.73 ± 10.12	69.57 ± 10.54	2.61	0.011	0.59
<i>Hyperactivity</i>	61.39 ± 8.62	58.15 ± 12.40	1.37	0.174	0.30
<i>Impulsiveness</i>	65.12 ± 12.94	63.46 ± 14.12	0.54	0.594	0.12
<i>Self-concept problems</i>	62.82 ± 11.89	62.46 ± 10.87	0.14	0.889	0.03
ADHD Global Index	73.09 ± 9.23	67.72 ± 10.09	2.42	0.018	0.55
CAARS-O:L (mean±SD)					
<i>Inattention</i>	77.28 ± 10.08	68.55 ± 9.72	3.77	<0.001	0.88
<i>Hyperactivity</i>	58.84 ± 11.23	59.21 ± 12.58	-0.13	0.896	0.03
<i>Impulsiveness</i>	65.16 ± 14.12	61.60 ± 11.18	1.21	0.230	0.28
<i>Self-concept problems</i>	64.72 ± 11.62	60.45 ± 10.99	1.61	0.111	0.38
ADHD Global Index	72.81 ± 11.75	65.93 ± 9.57	2.78	0.007	0.65
CGI-S (mean±SD)	4.91 ± 0.38	4.68 ± 0.52	2.32	0.023	0.49
FAST (mean±SD)	33.79 ± 9.45	27.34 ± 9.74	2.98	0.004	0.67
WHODAS 2.0 (mean±SD)	28.24 ± 15.92	24.63 ± 15.71	0.99	0.326	0.23
BDI-II (mean±SD)	17.06 ± 9.96	15.15 ± 8.39	0.92	0.359	0.21
STAI state (mean±SD)	71.24 ± 26.08	68.85 ± 24.72	0.42	0.679	0.09

Abbreviations: ADHD-RS: Attention Deficit/Hyperactivity Disorder Rating Scale; BDI-II: Beck Depression Inventory-II; CAARS: Conners' Adult ADHD Rating Scales; CGI-S: Clinical Global Impression-Severity; FAST: Functioning Assessment Short Test; SD: Standard deviation; STAI: State-Trait Anxiety Inventory; WHODAS 2.0: World Health Organization Disability Assessment Schedule 2.0; WURS: Wender Utah Rating Scale.

= 315.941, $p < 0.001$), demonstrating the intervention's strong effect on core symptoms. Likewise, both self-reported (CAARS-S:L) and observer-reported (CAARS-O:L) subscales revealed significant decreases over time ($p < 0.001$), underscoring consistent symptom improvement across informants.

Clinician-rated severity also declined markedly (CGI-S, $F = 283.014$, $p < 0.001$), indicating meaningful clinical change. Emotional comorbidities improved significantly as well, with reductions in depressive symptoms (BDI-II; $F = 51.606$, $p < 0.001$) and anxiety symptoms (STAI; $F = 22.761$, $p < 0.001$). Finally, participants experienced notable gains in psychosocial functioning (FAST scale, $F = 165.750$, $p < 0.001$) and reductions in disability (WHODAS 2.0, $F = 35.864$, $p < 0.001$).

Time x sex interactions

No significant time \times sex interactions were observed across most outcomes in the pre–post analysis, suggesting that both males and females experienced similar improvements following the intervention. An exception was found for inattention, which showed a significant reduction on the observer-rated subscale CAARS-O:L ($p = 0.043$). However, this effect did not remain statistically significant after adjusting for baseline ADHD symptom severity, suggesting that baseline severity may partly account for this finding.

Time x group x sex interactions

Interactions between time, group, and sex were not significant for most outcomes, suggesting consistent improvements across groups and sexes over time.

Longitudinal effects at 3- and 6-month follow-ups

Regarding the longitudinal effects at 3- and 6-month follow-ups, a total of 55 participants completed the 6-month follow-up assessment. 25 participants (31.3 %) did not participate at follow-up. Although reasons for attrition were not systematically recorded, available clinical information indicated that loss at follow-up was primarily related to logistical or personal factors, including difficulties attending follow-up visits due to work or personal commitments, as well as loss of contact. No significant differences were found between participants who completed the 6-month follow-up and those who did not, in terms of baseline clinical or sociodemographic variables (see **Supplementary Table 1**).

Due to attrition over time, the analyses reported in **Supplementary Table 2**—corresponding to 6-month follow-up—are based on this reduced subsample. Therefore, follow-up interaction findings should be interpreted as exploratory.

Effect of time

Significant improvements were observed across all primary and secondary outcomes over time. ADHD symptom severity, as measured by the ADHD-RS, decreased substantially ($F = 36.238$, $p < 0.001$), reflecting the efficacy of the intervention in reducing core symptoms. Similarly, significant reductions over time were noted in both self-reported (CAARS-S:L) and observer-reported (CAARS-O:L) subscales ($p < 0.001$).

A substantial clinical improvement was also observed (CGI-S, $F = 231.113$, $p < 0.001$), with significant reductions in depressive symptoms (BDI-II; $F = 49.805$, $p < 0.001$) and anxiety symptoms (STAI; $F = 30.862$, $p < 0.001$). Psychosocial functioning improved significantly (FAST scale, $F = 33.670$, $p < 0.001$), as did disability levels (WHODAS 2.0, $F = 42.584$, $p < 0.001$).

Time x sex interactions

No significant time \times sex interactions were observed throughout the analyses.

Time x group x sex interactions

A significant interaction emerged for clinical severity (CGI-S) at the 6-month follow-up ($F = 2.706$, $p = 0.047$). Specifically, females who received the 6-session CBT intervention demonstrated smaller reductions in CGI-S scores over time compared to males in the same intervention arm and all participants (both males and females) in the 12-session group (see **Figure 1**). However, when baseline ADHD symptom severity was included as a covariate, this interaction no longer reached statistical significance ($p = 0.052$).

Table 2
Efficacy of CBT according to sex in pre and post-treatment evaluations.

Scales	Time	12-session		6-session		Time		Time * Sex		Time * Group * Sex	
		Females (n= 33)	Males (n= 41)	Females (n= 33)	Males (n= 41)	F	p	F	p	F	p
ADHD-RS	Pre	35.71 ± 6.65	33.15 ± 5.77	38.19 ± 6.8	32.71 ± 7.04	315.941	<0.001	3.810	0.055	0.225	0.637
	Post	20.76 ± 6.91	20.40 ± 5.01	23.88 ± 3.81	22.00 ± 5.12						
CAARS-S:L Inattention	Pre	74.38 ± 10.33	69.88 ± 11.64	76.69 ± 10.30	70.17 ± 10.85	60.185	<0.001	0.322	0.572	0.677	0.414
	Post	62.63 ± 8.68	61.76 ± 12.46	66.69 ± 5.97	59.50 ± 8.68						
Hyperactivity	Pre	60.63 ± 8.60	62.94 ± 10.73	61.69 ± 8.93	55.22 ± 11.99	34.392	<0.001	0.170	0.681	0.533	0.468
	Post	52.94 ± 9.37	57.53 ± 10.67	56.88 ± 6.82	49.78 ± 8.83						
Impulsiveness	Pre	64.63 ± 12.94	63.24 ± 14.92	64.94 ± 13.47	64.89 ± 11.03	26.761	<0.001	0.012	0.911	0.968	0.329
	Post	56.76 ± 12.43	58.35 ± 12.69	58.38 ± 9.36	55.94 ± 8.60						
Self-concept problems	Pre	64.06 ± 12.13	62.59 ± 13.34	62.13 ± 12.12	65.44 ± 8.04	15.792	<0.001	1.010	0.319	0.144	0.706
	Post	59.63 ± 10.20	56.53 ± 8.64	58.88 ± 7.29	58.61 ± 8.64						
ADHD Global Index	Pre	73.44 ± 8.62	68.59 ± 9.51	72.75 ± 10.36	69.50 ± 8.10	53.716	<0.001	0.292	0.591	1.592	0.212
	Post	62.94 ± 8.84	62.35 ± 10.85	64.63 ± 5.21	59.67 ± 9.77						
CAARS-O:L Inattention	Pre	78.50 ± 10.08	66.94 ± 10.34	76.00 ± 10.66	69.47 ± 9.28	69.479	<0.001	4.294	0.043	0.252	0.618
	Post	67.21 ± 7.60	61.53 ± 7.60	63.53 ± 9.34	60.59 ± 5.71						
Hyperactivity	Pre	58.50 ± 11.55	62.65 ± 11.70	57.80 ± 11.19	54.41 ± 10.53	12.089	<0.001	0.75	0.785	0.274	0.602
	Post	55.14 ± 8.60	57.18 ± 12.82	52.67 ± 9.22	49.94 ± 6.62						
Impulsiveness	Pre	64.71 ± 15.18	57.88 ± 12.17	63.87 ± 13.78	64.53 ± 10.18	16.993	<0.001	0.115	0.736	0.003	0.957
	Post	61.57 ± 7.99	55.41 ± 8.00	56.47 ± 9.88	58.06 ± 7.51						
Self-concept problems	Pre	68.00 ± 9.60	54.20 ± 10.56	63.92 ± 12.46	62.40 ± 9.06	4.742	0.007	0.666	0.579	0.778	0.514
	Post	60.50 ± 8.66	53.90 ± 8.38	56.83 ± 9.30	56.00 ± 8.46						
ADHD Global Index	Pre	72.86 ± 12.46	61.24 ± 9.87	70.93 ± 11.21	70.35 ± 6.35	42.945	<0.001	1.878	0.176	0.414	0.522
	Post	66.36 ± 6.93	59.35 ± 7.10	59.27 ± 6.52	60.35 ± 5.21						
CGI-S	Pre	4.82 ± 0.39	4.65 ± 0.49	5.00 ± 0.36	4.67 ± 0.48	283.014	<0.001	0.566	0.454	0.995	0.322
	Post	3.47 ± 0.80	3.00 ± 0.79	3.63 ± 0.62	3.33 ± 0.79						
FAST	Pre	34.12 ± 10.41	28.00 ± 8.76	34.31 ± 8.23	26.14 ± 9.59	165.750	<0.001	1.576	0.214	0.012	0.912
	Post	22.76 ± 8.79	18.25 ± 7.94	25.88 ± 7.06	19.62 ± 6.25						
WHODAS 2.0	Pre	33.46 ± 17.03	26.16 ± 16.99	24.06 ± 14.55	24.95 ± 12.91	35.864	<0.001	0.003	0.960	0.001	0.971
	Post	23.40 ± 12.30	16.05 ± 11.07	15.19 ± 12.72	15.80 ± 10.29						
BDI-II	Pre	17.50 ± 10.61	14.78 ± 9.85	16.56 ± 9.92	15.05 ± 6.73	51.606	<0.001	0.118	0.732	0.216	0.644
	Post	12.19 ± 7.00	9.67 ± 6.60	10.44 ± 6.26	7.57 ± 4.88						
STAI State	Pre	60.63 ± 29.74	65.47 ± 29.54	80.38 ± 17.87	71.10 ± 21.88	22.761	<0.001	0.136	0.713	0.002	0.965
	Post	49.25 ± 31.64	51.53 ± 26.90	64.44 ± 17.49	53.14 ± 21.50						

Abbreviations: ADHD-RS: Attention Deficit/Hyperactivity Disorder Rating Scale; BDI-II: Beck Depression Inventory-II; CAARS: Conners' Adult ADHD Rating Scales; CGI-S: Clinical Global Impression-Severity; FAST: Functioning Assessment Short Test; STAI: State-Trait Anxiety Inventory; WHODAS 2.0: World Health Organization Disability Assessment Schedule 2.0.

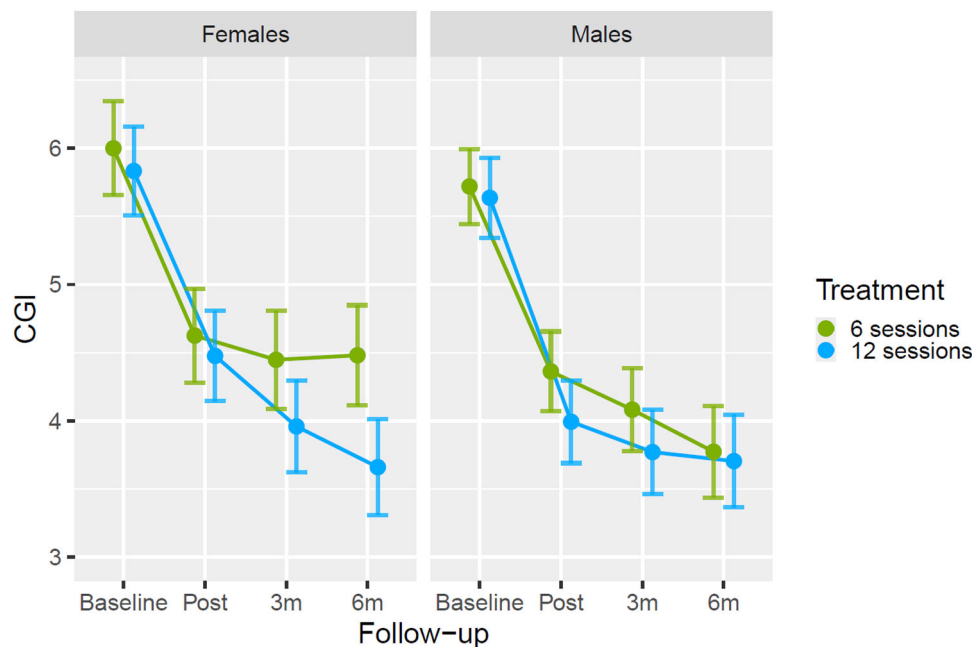


Fig. 1. Evolution of severity scores from baseline to 6-month follow-up, stratified by sex (female vs. male) and treatment condition (6-session vs. 12-session program).

Abbreviations: CGI= Clinical Global Impression Severity Scale.

Discussion

The main finding of this study — that adjunctive CBT significantly improves ADHD symptoms and functional outcomes in adults with comparable overall benefits across sexes— supports the efficacy of CBT programs as an adjunctive intervention with ongoing pharmacological treatment in reducing ADHD symptoms and improving psychosocial functioning. Our results demonstrate that these benefits are consistent across sexes, reinforcing the value of a multimodal approach where CBT provides essential compensatory strategies that complement the neurobiological effects of medication.

The observed sex differences in baseline characteristics align with existing literature, indicating that females with ADHD are more likely to exhibit higher symptom severity, inattention and greater functional impairments.^{14,17} Notably, no significant sex differences were observed in measures of anxiety (STAI) or depressive symptoms (BDI-II) at baseline. This finding may be explained by the inclusion criteria requiring participants to be on stable pharmacological treatment which may have reduced the impact of pre-existing sex differences in emotional distress by reducing symptom variability and ensuring a more homogeneous clinical profile at study entry, allowing us to isolate the specific effects of the psychological intervention. This is particularly noteworthy given that adult women with ADHD typically exhibit a significantly higher prevalence of comorbid anxiety and mood disorders compared to men.⁴⁶ Furthermore, recent longitudinal evidence suggests that females with ADHD demonstrate a more complex developmental trajectory, maintaining or even increasing levels of emotional dysregulation, irritability, and internalizing symptoms compared to males as they mature.⁴⁷

These sex-specific differences in baseline characteristics underscore the importance of integrating sex-sensitive approaches in ADHD assessment.⁴⁸ Recognizing and addressing these differences ensures that diagnostic tools and clinical evaluations accurately capture the full spectrum of symptoms and functional impairments across sexes. In this regard, systematic reviews have highlighted that women with ADHD often experience greater impairment in social functioning and stress management compared to men, despite the historically male-centric view of the disorder.⁴⁹ In fact, females are diagnosed much later in life, often due to their symptoms being less overt or aligning more with inattentive and internalizing profiles, which can be overlooked in traditional diagnostic frameworks.^{26,50} Adopting a more nuanced, sex-sensitive approach could help mitigate these delays and improve early identification and intervention for women with ADHD.

The findings of this study reaffirm the efficacy of CBT programs in adults with ADHD, consistent with previous research.^{8,51} An initial time \times sex interaction was observed in the pre–post assessment for inattention on the observer-rated subscale CAARS-O:L ($p = 0.043$). However, this effect did not remain statistically significant after adjusting for baseline ADHD symptom severity, suggesting that baseline severity may partly account for this finding rather than sex per se. Moreover, this effect was not sustained at the 6-month follow-up, and the overall absence of significant time \times sex interactions across most clinical and functional outcomes indicates that both males and females derive comparable benefits from CBT interventions. This finding reinforces the broad applicability and effectiveness of standard CBT protocols across sexes, offering valuable guidance for clinicians. Additionally, the observed improvements in psychosocial functioning and reductions in disability levels underscore the potential of both CBT programs to address the wider functional impairments often associated with ADHD.⁵²

The significant time \times group \times sex interaction observed for CGI-S scores suggests that females in the 6-session group showed more modest reductions in clinical severity during follow-up. As shown in [Figure 1](#), these differences are particularly evident at the 3- and 6-month follow-ups, suggesting challenges in maintaining clinical improvements over time in this subgroup. However, sensitivity analyses adjusting for baseline ADHD symptom severity indicated that this interaction effect

no longer reached statistical significance. This finding must be interpreted with caution, as this interaction was isolated to the clinician-rated CGI-S scale and was not mirrored in other primary symptom or functional measures. Furthermore, the pronounced sample attrition observed during the follow-up period resulted in a limited subsample of female participants, which restricts the ability to draw definitive conclusions and suggests that these results should be regarded as preliminary. Taken together, these results are more consistent with a severity-related confounding effect rather than with a robust sex-specific difference in treatment response. Importantly, baseline ADHD symptom severity did not significantly interact with time, indicating that higher initial severity was not associated with differential rates of change over the course of treatment. Although the present findings do not support robust sex-specific differences in treatment efficacy, it is important to acknowledge that women with ADHD more frequently present with greater baseline symptom severity and clinical complexity at treatment entry, as consistently reported in the literature.^{14,17} Consequently, challenges related to treatment intensity and maintenance of gains may be more commonly observed in female patients in routine clinical practice, even when sex itself is not the primary driver of differential treatment response.

From a clinical perspective, challenges in maintaining treatment gains following the shorter CBT protocol may be related to mechanisms associated with treatment intensity and skill consolidation rather than to sex-specific effects per se. Individuals with higher baseline symptom severity may experience greater cognitive and emotional load, which could limit the sustained application of CBT strategies over time. In this context, the longer treatment format may provide additional therapeutic scaffolding and opportunities for rehearsal, reinforcement, and integration of skills, potentially facilitating maintenance of improvements beyond the acute treatment phase. These considerations are presented as a potential hypothesis and should be interpreted in light of the limited power of subgroup analyses at follow-up. Beyond baseline severity, additional sex-related clinical and contextual factors may still play an indirect role in shaping treatment engagement and long-term outcomes. For instance, sex-related differences in employment rates, access to specialized care, and the impact of hormonal fluctuations throughout the lifespan—as evidence suggests that variations in sex hormones can exacerbate symptoms and affect treatment stability in females.⁵³ Moreover, research shows that females are less likely to be prescribed ADHD medication compared to males⁵⁴ and may experience different pharmacokinetics, effectiveness, and adherence patterns, particularly across reproductive life transitions.⁵⁵ In light of the present findings, these factors should be interpreted as contextual variables that may interact with baseline clinical severity, rather than as independent drivers of differential treatment efficacy. From a clinical perspective, these results suggest that baseline symptom severity should be carefully considered when interpreting apparent differences in treatment trajectories, especially at longer follow-up intervals. Accordingly, tailoring CBT interventions based on initial severity and individual needs—rather than sex alone—may represent a clinically plausible and hypothesis-driven approach to optimizing long-term outcomes. Future research with larger samples should further explore how baseline severity, intervention length, and follow-up strategies jointly influence treatment response across sexes, using adequately powered longitudinal designs.

Nonetheless, certain limitations of the present study must be taken into account. Firstly, the relatively small sample size, especially when divided into subgroups, may have reduced statistical power. Additionally, the loss of participants at the 3- and 6-month follow-ups led to a smaller sample at these later time points, potentially further limiting the ability to detect effects over time. This limitation is particularly relevant for subgroup analyses conducted at the 6-month follow-up, which may increase susceptibility to Type I error and reduce the robustness of interaction effects. Although no statistically significant differences were observed between participants who completed the 6-month follow-up

and those who dropped out (see **Supplementary Table 1**), the limited sample size may have reduced the statistical power to detect subtle or clinically meaningful differences, and therefore the presence of attrition bias cannot be fully ruled out. Consequently, this analysis should be interpreted as exploratory in nature, aiming to generate hypotheses for future studies with larger and more representative samples. Secondly, although objective neuropsychological tests were not included, the use of the CAARS-S:L and CAARS-O:L scales provide complementary perspectives through self-report and observer ratings. Both instruments are widely validated and the subjective perception of symptoms holds considerable clinical value—particularly in psychotherapy contexts—since it reflects patient insight and readiness to engage in treatment. Moreover, observer-based measures such as the CGI and FAST help balance potential subjective bias. Thirdly, the absence of data on sex hormones and menstrual status in females could have influenced symptomatology and treatment response, affecting the interpretation of sex differences. Finally, potential confounding effects of medication use and comorbidities on treatment outcomes cannot be entirely ruled out.

Conclusion

This study demonstrates the efficacy of adjunctive CBT programs in treating medicated adults with ADHD, showing comparable outcomes across sexes for most clinical and functional measures. While baseline differences in ADHD severity and the observed preliminary time x group x sex interaction for CGI-S scores suggest potential challenges in maintaining long-term improvements for females in the shorter 6-session group, these findings were better explained by baseline clinical burden and treatment intensity rather than by sex-specific differences in treatment response.

Given that this interaction was observed in a single clinician-rated instrument and a reduced sample of women at follow-up, these results should be interpreted as exploratory. Nevertheless, these findings highlight the importance of considering the interplay between sex-specific clinical profiles, baseline severity, and treatment duration—rather than sex as a primary determinant—when optimizing long-term outcomes within a multimodal framework. Studies with larger sample sizes and greater statistical power are needed to further clarify how sex-related clinical profiles and initial symptom severity interact to influence treatment maintenance and long-term therapeutic stability.

Future research should include longitudinal designs to assess the durability of CBT effects beyond six months. Additionally, larger and more diverse sample sizes are needed to validate these results and further explore the clinical significance of the observed sex differences. Investigating the interplay between ADHD symptoms, comorbidities, and treatment response in more diverse populations is also essential to generalize these findings to broader clinical settings. In light of the present results, we recommend that studies should explicitly account for baseline symptom severity when examining subgroup differences in long-term treatment outcomes, as this factor may be a more critical predictor of maintenance than sex alone. Finally, research should consider the potential influence of gender identity, beyond sex assigned at birth, on treatment engagement and therapeutic outcomes.

CRedit authorship contribution statement

Juan Jesús Crespín: Formal analysis, Data curation, Investigation, Writing – review & editing. **Montse Corrales:** Conceptualization, Investigation, Data curation, Methodology, Writing – original draft. **Vanesa Richarte:** Methodology, Data curation, Investigation, Writing – review & editing. **Gemma Parramón:** Investigation, Writing – review & editing. **Santiago Biel:** Investigation, Data curation, Writing – review & editing. **Ferran Mestres:** Investigation, Writing – review & editing. **Carolina Ramos-Sayalero:** Data curation, Writing – review & editing. **Pol Ibáñez:** Data curation, Writing – review & editing, Project administration, Resources. **Gemma Nieva:** Methodology, Data curation,

Writing – review & editing. **Carla Torrent:** Formal analysis, Methodology, Writing – review & editing. **Derek Clougher:** Writing – review & editing. **Christian Fadeuilhe:** Methodology, Data curation, Investigation, Writing – review & editing. **Silvia Amoretti:** Conceptualization, Supervision, Methodology, Writing – original draft, Writing – review & editing. **Josep Antoni Ramos-Quiroga:** Conceptualization, Supervision, Methodology, Writing – review & editing, Project administration, Funding acquisition.

Ethics statement

The study was approved by the Clinical Research Ethics Committee of the Vall d'Hebron University Hospital. The study participants have provided written informed consent for their participation in the study.

Financial support

This research was supported by the Generalitat de Catalunya, Departament de Recerca i Universitats, through the Comissionat per a Universitats i Recerca (SGR grant 2021 SGR 00840).

Conflicts of interest

Dr. Vanesa Richarte declares that she has given lectures or received help to attend conferences from Rubió and Shire/Takeda. Dr. Christian Fadeuilhe declares that he has given lectures or received help to attend conferences from Rubió and Shire/Takeda. Dr. Montse Corrales declares that she has received help to attend conferences from Shire/Takeda. Dr. Silvia Amoretti has been a consultant to and/or has received honoraria/grants from Otsuka-Lundbeck, with no financial or other relationship relevant to the subject of this article. Professor Josep Antoni Ramos-Quiroga was on the speakers' bureau and/or acted as consultant for Biogen, Idorsia, Casen-Recordati, Johnson&Johnson, Novartis, Takeda, Bial, Sincrolab, Neuraxpharm, Novartis, BMS, Medice, Rubió, Uriach, Technofarma and Raffo in the last 3 years. He also received travel awards (air tickets + hotel) for taking part in psychiatric meetings from Idorsia, Johnson&Johnson, Rubió, Takeda, Bial and Medice. The Department of Psychiatry chaired by him received unrestricted educational and research support from the following companies in the last 3 years: Exeltis, Idorsia, Casen-Recordati, Takeda, Neuraxpharm, Oryzon, Roche, Probitas and Rubió, Johnson&Johnson.

All other authors report no financial or other relationship relevant to the subject of this article.

Acknowledgements

We are extremely grateful to all participants.

Dr. Amoretti (PI24/00671) and Dr. Torrent (PI20/00344; PI24/00407) thank the support of the Spanish Ministry of Innovation and Science, funded by the Instituto de Salud Carlos III and cofinanced by the European Union (FEDER) "Una manera de hacer Europa". Dr. Amoretti has been supported by Sara Borrell doctoral programme (CD20/00177) and M-AES mobility fellowship (MV22/00002), from the Instituto de Salud Carlos III (ISCIII), and co-funded by European Social Fund "Investing in your future" and La Marató-TV3 Foundation grants 202234-32. Dr. Ramos-Quiroga was also supported by the European Union H2020 Programme (H2020/2014–2020) under grant agreement no. 848228 (DISCOVERIE).

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.ejpsy.2026.100345](https://doi.org/10.1016/j.ejpsy.2026.100345).

Data availability

The data that support the findings of this study are available on request from the corresponding authors.

References

- Association American Psychiatric. *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR)*. Washington, DC: American Psychiatric Association Publishing; 2022.
- Faraone SV, Asherson P, Banaschewski T, et al. Attention-deficit/hyperactivity disorder. *Nat Rev Dis Primers*. 2015;1, 15020. <https://doi.org/10.1038/nrdp.2015.20>.
- Fayyad J, Sampson NA, Hwang I, et al. The descriptive epidemiology of DSM-IV Adult ADHD in the World Health Organization World Mental Health Surveys. *Atten Defic Hyperact Disord*. 2017;9(1):47–65. <https://doi.org/10.1007/s12402-016-0208-3>.
- Biederman J, Monuteaux MC, Mick E, et al. Young adult outcome of attention deficit hyperactivity disorder: a controlled 10-year follow-up study. *Psychol Med*. 2006;36(2):167–179. <https://doi.org/10.1017/S0033291705006410>.
- Bernardi S, Faraone SV, Cortese S, et al. The lifetime impact of attention-deficit hyperactivity disorder: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychol Med*. 2012;42(4):875–887. <https://doi.org/10.1017/S003329171100153X>.
- Kooij JJS, Bijlenga D, Salerno L, et al. Updated European Consensus Statement on diagnosis and treatment of adult ADHD. *Eur Psychiatry*. 2019;56:14–34. <https://doi.org/10.1016/j.eurpsy.2018.11.001>.
- Safren SA, Otto MW, Sprich S, et al. Cognitive-behavioral therapy for ADHD in medication-treated adults with continued symptoms. *Behav Res Ther*. 2005;43(7):831–842. <https://doi.org/10.1016/j.brat.2004.07.001>.
- Young Z, Moghaddam N, Tickle A. The Efficacy of Cognitive Behavioral Therapy for Adults With ADHD: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *J Atten Disord*. 2020;24(6):875–888. <https://doi.org/10.1177/1087054716664413>.
- Knouse LE, Safren SA. Current status of cognitive behavioral therapy for adult attention-deficit hyperactivity disorder. *Psychiatr Clin North Am*. 2010;33(3):497–509. <https://doi.org/10.1016/j.psc.2010.04.001>.
- Lopez PL, Torrente FM, Ciapponi A, et al. Cognitive-behavioural interventions for attention deficit hyperactivity disorder (ADHD) in adults. *Cochrane Database Syst Rev*. 2013;11. <https://doi.org/10.1002/14651858.CD010840>. CD010840.
- Philipsen A, Jans T, Graf E, et al. Effects of group psychotherapy, individual counseling, methylphenidate, and placebo in the treatment of adult attention-deficit/hyperactivity disorder: a randomized clinical trial. *JAMA Psychiatry*. 2015;72(12):1199–1210. <https://doi.org/10.1001/jamapsychiatry.2015.2146>.
- Young S, Khondoker M, Emilsson B, et al. Cognitive-behavioural therapy in medication-treated adults with attention-deficit/hyperactivity disorder and comorbid psychopathology: a randomized controlled trial using multi-level analysis. *Psychol Med*. 2015;45(13):2793–2804. <https://doi.org/10.1017/S0033291715000756>.
- Corrales M, García-González S, Richarte V, et al. Long-term efficacy of a new 6-session cognitive behavioral therapy for adults with attention-deficit/hyperactivity disorder: a randomized, controlled clinical trial. *Psychiatry Res*. 2024;331, 115642. <https://doi.org/10.1016/j.psychres.2023.115642>.
- Williamson D, Johnston C. Gender differences in adults with attention-deficit/hyperactivity disorder: a narrative review. *Clin Psychol Rev*. 2015;40:15–27. <https://doi.org/10.1016/j.cpr.2015.05.005>.
- Cortese S, Faraone SV, Bernardi S, Wang S, Blanco C. Gender differences in adult attention-deficit/hyperactivity disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *J Clin Psychiatry*. 2016;77(4):e421–e428. <https://doi.org/10.4088/JCP.14m09630>.
- Quinn PO. Attention-deficit/hyperactivity disorder and its comorbidities in women and girls: an evolving picture. *Curr Psychiatry Rep*. 2008;10(5):419–423. <https://doi.org/10.1007/s11920-008-0067-5>.
- Carboneau LM, Demers M, Bigras M, Guay MC. Meta-analysis of sex differences in ADHD symptoms and associated cognitive deficits. *J Atten Disord*. 2021;25(12):1640–1656. <https://doi.org/10.1177/1087054720923736>.
- Parvaresh N, Ziaadini H, Erfani R, Shokoohi M. Prevalence of attention deficit hyperactivity disorder and its relation with depression. *J Gorgan Univ Med Sci*. 2014;16(1):94–99.
- Flory K, Shi D, Siceloff ER, et al. The factor structure and gender invariance of ADHD symptoms in college students. *Assessment*. 2021;28(1):57–72. <https://doi.org/10.1177/1073191120918934>.
- Hinshaw SP. Preadolescent girls with attention-deficit/hyperactivity disorder: I. Background characteristics, comorbidity, cognitive and social functioning, and parenting practices. *J Consult Clin Psychol*. 2002;70(5):1086. <https://doi.org/10.1037/0022-006X.70.5.1086>.
- Bauermeister JJ, Shrout PE, Chávez L, et al. ADHD and gender: are risks and sequela of ADHD the same for boys and girls? *J Child Psychol Psychiatry*. 2007;48(8):831–839. <https://doi.org/10.1111/j.1469-7610.2007.01750.x>.
- Bruchmüller K, Margraf J, Schneider S. Is ADHD diagnosed in accord with diagnostic criteria? Overdiagnosis and influence of client gender on diagnosis. *J Consult Clin Psychol*. 2012;80(1):128–138. <https://doi.org/10.1037/a0026582>.
- Ohan JL, Visser TAW. Why is there a gender gap in children presenting for attention deficit/hyperactivity disorder services? *J Clin Child Adolesc Psychol*. 2009;38(5):650–660. <https://doi.org/10.1080/15374410903103627>.
- Waschbusch DA, King S. Should sex-specific norms be used to assess attention-deficit/hyperactivity disorder or oppositional defiant disorder? *J Consult Clin Psychol*. 2006;74(1):179–185. <https://psycnet.apa.org/doi/10.1037/0022-006X.74.1.179>.
- Babinski DE. Sex differences in ADHD: review and priorities for future research. *Curr Psychiatry Rep*. 2024;26(4):151–156. <https://doi.org/10.1007/s11920-024-01492-6>.
- Skoglund C, Sundström Poromaa I, Leksell D, et al. Time after time: failure to identify and support females with ADHD - a Swedish population register study. *J Child Psychol Psychiatry*. 2024;65(6):832–844. <https://doi.org/10.1111/jcpp.13920>.
- Kok FM, Groen Y, Fuermaier ABM, Tucha O. The female side of pharmacotherapy for ADHD—A systematic literature review. *PLoS One*. 2020;15(9), e0239257. <https://doi.org/10.1371/journal.pone.0239257>.
- Richarte V, Corrales M, Pozuelo M, et al. Spanish validation of the adult Attention Deficit/Hyperactivity Disorder Rating Scale (ADHD-RS): relevance of clinical subtypes. *Rev Psiquiatr Salud Ment*. 2017;10(4):185–191. <https://doi.org/10.1016/j.rpsm.2017.06.003>.
- Guy W. *Clinical Global Impressions. ECDEU Assessment Manual for Psychopharmacology*. Rockville, MD: National Institute of Mental Health; 1976: 217–222.
- Urbaniank GC, Plous S. Research Randomizer [Internet] [cited 2025 Jul 20]. Available from: <http://www.randomizer.org/>; 2013.
- Ramos-Quiroga JA, Bosch R, Richarte V, et al. Criterion and concurrent validity of Conners Adult ADHD Diagnostic Interview for DSM-IV (CAADID) Spanish version. *Rev Psiquiatr Salud Ment*. 2012;5(4):229–235. <https://doi.org/10.1016/j.rpsm.2012.05.004>.
- Ramos-Quiroga JA, Nasillo V, Richarte V, et al. Criteria and Concurrent Validity of DIVA 2.0: A Semi-Structured Diagnostic Interview for Adult ADHD. *J Atten Disord*. 2019;23(10):1126–1135. <https://doi.org/10.1177/1087054716646451>.
- Ward MF, Wender PH, Reimherr FW. The Wender Utah Rating Scale: An aid in the retrospective diagnosis of childhood attention deficit hyperactivity disorder. *Am J Psychiatry*. 1993;150(6):885–890. <https://doi.org/10.1176/ajp.150.6.885>.
- Rodríguez-Jiménez R, Pascual-Antón MC, MA Jiménez-Arriero, Ponce G, Ortiz-Sánchez PA, Palomo T. Validation of the Spanish version of the Wender Utah Rating Scale (WURS) for the retrospective diagnosis of attention deficit hyperactivity disorder in adults. *Rev Neurol*. 2001;33(2):138–144.
- Conners CK, Erhardt D, Sparrow EP. *Conners' Adult ADHD Rating Scales (CAARS): Technical manual*. North Tonawanda, NY: Multi-Health Systems; 1999.
- Amador-Campos JA, Gómez-Benito J, Ramos-Quiroga JA. The conners' adult ADHD rating scales—short self-report and observer forms: psychometric properties of the Catalan version. *J Atten Disord*. 2014;18(8):671–679. <https://doi.org/10.1177/1087054712446831>.
- Beck AT, Steer RA, Brown GK. *Manual for the Beck Depression Inventory-II*. San Antonio (TX): Psychological Corporation; 1996.
- Sanz J, Perdigón AL, Vázquez C. Adaptación española del Inventario para la Depresión de Beck-II (BDI-II): 2. Propiedades psicométricas en población general. *Clínica y Salud [Internet]*. 2003;14(3):249–280. Recuperado de: <https://www.redalyc.org/articulo.oa?id=180617972001>.
- Spielberger CD, Gorsuch RL, Lushene RE. *Manual for the State-Trait Anxiety Inventory*. Palo Alto (CA): Consulting Psychologists Press; 1970.
- Guillén-Riquelme A, Buela-Casal G. Actualización psicométrica y funcionamiento diferencial de los ítems en el State Trait Anxiety Inventory (STAI). *Psicothema*. 2011; 23(3):510–515.
- Rosa AR, Sánchez-Moreno J, Martínez-Aran A, et al. Validity and reliability of the Functioning Assessment Short Test (FAST) in bipolar disorder. *Clin Pract Epidemiol Ment Health*. 2007;3(1):5. <https://doi.org/10.1186/1745-0179-3-5>.
- Rotger S, Richarte V, Nogueira M, et al. Psychometric properties of the Functioning Assessment Short Test (FAST) in adult ADHD. *Eur Arch Psychiatry Clin Neurosci*. 2014;264(8):719–727. <https://doi.org/10.1007/s00406-014-0501-0>.
- Ustün TB, Kostanjsek N, Chatterji S, Rehm J. *Schedule WHODAS 2.0. Measuring health and disability: Manual for WHO Disability Assessment*. Geneva: World Health Organization; 2010.
- Amoretti S, Crespín JJ, Corrales M, et al. Validation of the 12-item World Health Organization Disability Assessment Schedule (WHODAS 2.0) in adults with attention-deficit hyperactivity disorder. *BJPsych Open*. 2025;11(6):e257. <https://doi.org/10.1192/bjo.2025.10873>.
- Safren SA. Cognitive-behavioral approaches to ADHD treatment in adulthood. *J Clin Psychiatry*. 2006;67(Suppl 8):46–50. <https://doi.org/10.4088/jcp.v67n0807>.
- Hartman CA, Larsson H, Vos M, et al. Anxiety, mood, and substance use disorders in adult men and women with and without attention-deficit/hyperactivity disorder: a substantive and methodological overview. *Neurosci Biobehav Rev*. 2023;151, 105209. <https://doi.org/10.1016/j.neubiorev.2023.105209>.
- De Ronda AC, Rice L, Zhao Y, Rosch KS, Mostofsky SH, Seymour KE. ADHD-related sex differences in emotional symptoms across development. *Eur Child Adolesc Psychiatry*. 2024;33(5):1419–1432. <https://doi.org/10.1007/s00787-023-02251-3>.
- Babinski DE. Sex Differences in ADHD: Review and Priorities for Future Research. *Curr Psychiatry Rep*. 2024;26(4):151–156. <https://doi.org/10.1007/s11920-024-01492-6>.
- Faheem M, Akram W, Akram H, Khan MA, Siddiqui FA, Majeed I. Gender-based differences in prevalence and effects of ADHD in adults: A systematic review. *Asian J Psychiatr*. 2022;75, 103205. <https://doi.org/10.1016/j.ajp.2022.103205>.

50. Martin J, Langley K, Cooper M, et al. Sex differences in attention-deficit hyperactivity disorder diagnosis and clinical care: a national study of population healthcare records in Wales. *J Child Psychol Psychiatry*. 2024;65(12):1648–1658. <https://doi.org/10.1111/jcpp.13987>.
51. Li Y, Zhang L. Efficacy of cognitive behavioral therapy combined with pharmacotherapy versus pharmacotherapy alone in adult ADHD: a systematic review and meta-analysis. *J Atten Disord*. 2024;28(3):279–292. <https://doi.org/10.1177/10870547231214969>.
52. Rucklidge JJ. Gender differences in attention-deficit/hyperactivity disorder. *Psychiatr Clin North Am*. 2010;33(2):357–373. <https://doi.org/10.1016/j.psc.2010.01.006>.
53. Osianlis E, Thomas EHX, Jenkins LM, Gurvich C. ADHD and sex hormones in females: a systematic review. *J Atten Disord*. 2025;29(9):706–723. <https://doi.org/10.1177/10870547251332319>.
54. Westman E, Prami T, Kallio A, et al. Increase in occurrence of attention deficit hyperactivity disorder differs by age group and gender: Finnish nationwide register study. *Brain Behav*. 2025;15(1), e70253. <https://doi.org/10.1002/brb3.70253>.
55. Rapoport IL, Groenman AP. A review of sex and gender factors in stimulant treatment for ADHD: knowledge gaps and future directions. *J Atten Disord*. 2025;29(8):602–616. <https://doi.org/10.1177/10870547251315601>.