

A National Description of Treatment among United States Children and Adolescents with Attention-Deficit/Hyperactivity Disorder

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Objective To characterize lifetime and current rates of attention-deficit/hyperactivity disorder (ADHD) treatments among US children and adolescents with current ADHD and describe the association of these treatments with demographic and clinical factors.

Study design Data are from the 2014 National Survey of the Diagnosis and Treatment of ADHD and Tourette Syndrome, a follow-back survey of parents from the 2011-2012 National Survey of Children's Health. Weighted analyses focused on receipt of ADHD treatment among children aged 4-17 years with current ADHD (n = 2495) by 4 treatment types: medication, school supports, psychosocial interventions, and alternative treatments.

Results Medication and school supports were the most common treatments received, with two-thirds of children and adolescents with ADHD currently receiving each treatment. Social skills training was the most common psychosocial treatment ever received (39%), followed by parent training (31%), peer intervention (30%), and cognitive behavioral therapy (20%). Among alternative treatments, 9% were currently taking dietary supplements, and 11% had ever received neurofeedback. Most children (67%) had received at least 2 of the following: current medication treatment, current school supports, or lifetime psychosocial treatment; 7% had received none of these 3 treatment types.

Conclusions A majority of school-aged children and adolescents with ADHD received medication treatment and school supports, whereas fewer received recommended psychosocial interventions. Efforts to increase access to psychosocial treatments may help close gaps in service use by groups currently less likely to receive treatment, which is important to ensure that the millions of school-aged US children diagnosed with ADHD receive quality treatment. (*J Pediatr* 2017;■■■:■■-■■).

Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder that begins in childhood, results in pervasive functional impairment, and has been diagnosed in 11% of children aged 4-17 years in the US.^{1,2} Children with ADHD are more likely than their peers to experience adverse long-term outcomes, including poor school outcomes, more frequent injury, higher rates of co-occurring psychiatric disorders, and greater healthcare utilization.³⁻⁶ Treatment guidelines recommend management of patients with ADHD according to the chronic care model.⁷

Medication treatment and parent- and teacher-delivered behavior therapy are evidence-based strategies for ADHD treatment; behavior therapy is recommended as the first-line treatment for children younger than 6 years, whereas combination therapy (behavior therapy and medication treatment) is recommended for children aged 6-11 years and preferred for children aged 12 years and older.⁷⁻⁹ A previous study of national parent survey data indicated that less than one-half of children with current ADHD (44%) received behavior therapy within the past year, whereas 74% received medication in the past week, with differences in treatment receipt by demographic factors such as age, race/ethnicity, and poverty status.¹⁰ However, these data did not allow for estimates by particular type of behavioral intervention (eg, peer interventions, parent training, school-based treatments), specifically forms that have empirical support as ADHD treatment.^{8,11-13} Other studies have shown trends in psychotherapy use relative to medication usage among children with ADHD,¹⁴⁻¹⁶ though there is limited published information available regarding specific types of psychological treatment received by children and adolescents with ADHD in the community.

The purpose of the present study is to characterize lifetime and current rates of pharmacologic and nonpharmacologic ADHD treatments overall and by demographic and clinical factors among a nationally drawn sample of children and adolescents with ADHD. This information can be used to describe the current status of ADHD treatment relative to best practices and may inform future research that seeks to identify barriers to receipt of recommended treatments as well as policy and programmatic efforts to promote more widespread use of recommended treatments for children with ADHD.

ADHD	Attention-deficit/hyperactivity disorder
CBT	Cognitive behavioral therapy
NSCH	National Survey of Children's Health
NS-DATA	National Survey of the Diagnosis and Treatment of ADHD and Tourette Syndrome

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Methods

This study used data from the ADHD module of the 2014 National Survey of the Diagnosis and Treatment of ADHD and Tourette Syndrome (NS-DATA), a follow-back survey of a nationally drawn subgroup of respondent households from the 2011-2012 US National Survey of Children's Health (NSCH). This survey was sponsored by the Centers for Disease Control and Prevention's National Center on Birth Defects and Developmental Disabilities and National Center for Health Statistics. A complete description of this survey and sample population has been published elsewhere.^{17,18} Briefly, NS-DATA was a follow-up survey of respondent parents and guardians (hereafter referred to as parents) who reported that their child had ever received an ADHD diagnosis by a doctor or healthcare provider on the 2011-2012 NSCH. The response rate for NS-DATA was 47%; when combined with the 23% response rate from the 2011-2012 NSCH, the final NS-DATA response rate was 11%. There were 2966 completed interviews overall for the ADHD module of NS-DATA; however, the analyses for this study were restricted to the sample of parents with children aged 4-17 years who had current ADHD based on parent report at the time of NS-DATA ($n = 2495$). Secondary analysis of these existing deidentified survey data was considered exempt from Centers for Disease Control and Prevention institutional review board review.

This study focused on NS-DATA questions related to lifetime and current treatment received for ADHD. Specifically, parents were asked whether their child had ever taken medication for ADHD, and whether their child had ever received any of the following 7 types of other treatments for ADHD or difficulties with their child's emotions, concentration or behavior: (1) "school-based educational support, intervention, or accommodation, such as tutoring, extra help from a teacher, preferential seating, extra time to complete work, or being enrolled in special education"; (2) "classroom management, such as reward systems, behavior modification, or a daily report card"; (3) "peer interventions, such as peer tutoring or the Good Behavior Game"¹⁹; (4) "social skills training, such as support in how to interact with others"; (5) "cognitive behavioral therapy" (CBT); (6) "dietary supplements, herbal supplements, or other nonprescription medications" (dietary supplements); or (7) "electroencephalogram neurofeedback or other kinds of biofeedback" (neurofeedback). If parents reported that their child had ever received any of these treatments or interventions, they were asked a follow-up question on whether the child was currently receiving the indicated treatment or intervention. Parents were also asked whether they had ever or were currently receiving parent training to help manage their child's ADHD. For this analysis, school-based educational support, intervention, or accommodation and classroom management were grouped into a single category of school supports, and peer interventions, social skills training, CBT, and parent training were grouped into a psychosocial treatment category. To compare combinations of treatments, we focused on 3 categories: current medication, current school supports, and

lifetime receipt of psychosocial treatments. The lifetime indicator was used for psychosocial treatments because of longer expected duration of effectiveness for these interventions²⁰ compared with the expectation for medication or school supports.

Comparisons were made across the following child-level demographic characteristics: sex, age (4-11 years, 12-17 years), race (white, black, other), ethnicity (Hispanic/Latino, non-Hispanic/Latino), primary language in the household (English, other language), household poverty status (<100% of federal poverty level, 100%-199% of federal poverty level, $\geq 200\%$ of federal poverty level), health insurance status (private, public, uninsured), continuous health insurance during previous 12 months (yes, no), and region of residence (Northeast, Midwest, South, West). Additional factors for comparison included current parent-reported ADHD severity (mild, moderate, severe), age when the child was first diagnosed with ADHD (before 6 years, 6-10 years, 11 years or older), and lifetime or current presence of any of the following co-occurring conditions: oppositional defiant disorder, conduct disorder, obsessive compulsive disorder, post-traumatic stress disorder, anxiety, bipolar disorder, other mood disorder such as depression, autism spectrum disorder or pervasive developmental disorder, sleep disorder, intellectual disability, learning disorder, language disorder, and tics. Treatment rates were also compared by whether the child had a medical home. The medical home indicator used by the National Center on Health Statistics incorporates the framework developed by the American Academy of Pediatrics.²¹ Medical homes are intended to optimize the effectiveness and efficiency of healthcare received by children by providing comprehensive and coordinated care. Individual indicators required to meet medical home criteria include having a personal physician or nurse, a usual place for care when sick, the ability to obtain needed referrals, family-centered care, and effective care coordination.²² Most demographic indicators and medical home status were from the 2011-2012 NSCH; poverty status, insurance status, and all other clinical indicators were collected in the 2014 NS-DATA survey.

Subgroup comparisons were tested for statistical significance using χ^2 tests. All analyses were completed using SAS-callable SUDAAN v 11.0.1 (RTI International, Cary, North Carolina) to take into account the complex sample design and sampling weights to adjust for selection probability, noncoverage, and nonresponse to minimize potential bias related to these factors.

Results

There were survey responses for 2495 children and adolescents with current ADHD reported in this survey. The demographic description of the sample can be found in **Table I** (available at www.jpeds.com).

Medication was the most commonly received ADHD treatment, with 90.8% of children in this study with current ADHD having ever received medication for ADHD (**Figure, Table II**). The second most common treatment ever received was school supports, with 85.8% of children with ADHD having received

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