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ADHD: Insurance and Mental Health Service Use

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Abstract

We describe mental health service use by insurance among children aged 4 to 17 with diagnosed attention-deficit/hyperactivity disorder (ADHD). Using parent reports from 2010-2013 National Health Interview Survey, we estimate the percentage that received services for emotional and behavioral difficulties (EBD): medication, other nonmedication services, and none (neither medication nor other nonmedication services). Among children with diagnosed ADHD, 56.0% had used medication for EBD, 39.8% had contact with a mental health professional, 32.2% had contact with a general doctor about the child's EBD, and 20.4% received special education services for EBD. Medication use was more often reported for privately or publicly insured children than uninsured children ($P < .001$), and uninsured children more often received no services ($P < .001$). Publicly insured children were more likely than privately insured children to receive other nonmedication services ($P < .001$). Less than a third (28.9%) of all children received no services as compared to almost half (48.8%) of uninsured children.

Keywords

mental health; service utilization; children; emotional and behavioral difficulties; serious emotional disorders

Attention-deficit/hyperactivity disorder (ADHD), a commonly diagnosed neurobehavioral condition of childhood, has important consequences for the well-being of children and their families.[1–9] The rise since the late 1990s in the prevalence of diagnosed ADHD among children[9,11–13] and the increase in the percentage of diagnosed children receiving treatment[10,14–17] have occurred in the context of expanding health insurance coverage for children. Accompanying the rise in insurance coverage have been shifts in insurance coverage type, with a decrease in the percentage of children with private health insurance coverage and an increase in the percentage with public coverage.[18–20] By 2013, approximately 40% of children had public insurance.[20] Past studies have reported

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Author Contributions

All authors contributed to the concept and design of the article, the analysis, and interpretation of the data. PNP drafted the article, and AES and CAR contributed to the revision of the article.

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conflicting findings about the impact of health insurance coverage on the use of services by children with diagnosed ADHD.[21–27]

The present study was undertaken to examine the use of medication and other nonmedication mental health services for a nationally representative sample of all children aged 4 to 17 with diagnosed ADHD. Specifically, we estimate differences in the use of services for emotional and behavioral difficulties (EBD),, including both medication and other nonmedication services,, by the child's health insurance coverage. Among children who use medication for emotional and behavioral difficulties, we describe the type of physician first providing medication and examine differences by the child's insurance coverage.

Methods

Data Source

The 2010-2013 National Health Interview Survey (NHIS), a nationally representative, cross-sectional, inperson household interview of the civilian noninstitutionalized population, was used for this study. The complex sample design is described in detail elsewhere.[28] An adult residing in the household who was knowledgeable about the child's health provided information about the sample child. Because more than 90% of the respondents for children were parents, the respondent is referred to as the child's parent. In 2010, 2011, 2012, and 2013, the response rate for the sample child segment of the survey was 70.7%, 74.6%, 69.7%, and 69.0%, respectively.[28–31] Data from 4 survey years (2010-2013) were combined to yield more reliable estimates. The sample for the analysis included 38 581 children aged 4 to 17 from the sample child files of the 2010-2013 NHIS. Because of missing data for diagnosed ADHD, 56 children were excluded.

Measures

Diagnosed ADHD.—Parents were asked, "Has a doctor or health professional ever told you that (sample child) had Attention Deficit Hyperactivity Disorder (ADHD) or Attention Deficit Disorder (ADD)?" If parents answered "Yes," the child was categorized as having diagnosed ADHD. Parent-reported diagnosis of ADHD has not been directly validated against a clinical standard for a national sample of US children. However, a comparison of the prevalence of diagnosed ADHD using parent-reported data from the 2007 National Survey of Children's Health with an estimate from a recent study using medical records for a large administrative sample of children indicated similar results, providing convergent validity for the survey estimate.[32]

Use of Medication for EBD.—The parents of all children were asked, "During the past six months, was (sample child) prescribed medication or taking prescription medication for difficulties with emotions, concentration, behavior, or being able to get along with others?" If the parent responded "Yes" to the medication question, the following question was asked: "Who first prescribed the medication. Was it … A pediatrician or other family doctor? … A psychiatrist, psychologist, or other mental health professional? … A neurologist? … Someone else?" In the remainder of this analysis, medication use refers only to medication

use for EBD. The category “emotional and behavioral difficulties” refers to the terminology used in the survey and is not equivalent to the educational classification of “emotional and behavioral disturbance.”

Use of Other Nonmedication Services for EBD.—The parents of all children were asked the following questions about health care contacts: (1) “During the past 12 months, have you seen or talked to any of the following health care providers about (sample child’s) health? … A mental health professional such as a psychiatrist, psychologist, psychiatric nurse, or clinical social worker? (2) Did you see or talk to a general doctor (a doctor in general practice, pediatrics, family medicine, or internal medicine) because of an emotional or behavioral problem that (sample child) may have?” Parents were also asked (1) if the child received special education or early intervention services and (2) if these services were received because of an emotional or behavioral problem. Throughout this analysis, the terms “difficulties” and “problems” are used interchangeably. Special education services for emotional and behavioral difficulties were included because previous research shows the increasing use of these services among children with diagnosed ADHD.[33,34] Use of nonmedication services, as a group, was defined as providing an affirmative answer to either questions about having seen or talked to a mental health professional or a general doctor because of child’s emotional and behavioral difficulties, or receiving special education or early intervention services specifically for emotional and behavioral difficulties.

Mutually Exclusive Categories of Service Use for EBD.—Based on answers to the questions on the use of medication and nonmedication services for EBD, children with diagnosed ADHD were classified into 3 mutually exclusive service groups: (1) use of medication (with or without use of nonmedication services), (2) use of nonmedication services only, and (3) no service use. Service use was classified into these 3 categories to describe the characteristics of children using the most prevalent kind of treatment (medication use) and to isolate differences in the use of only nonmedication services and no services by insurance coverage.

Child Demographic and Health Characteristics.—Children were categorized by the child’s health insurance at the time of interview (any private, public only, and uninsured). Children with both public and private health insurance are categorized as having private coverage. The covariates in the analysis included the child’s age, sex, race and Hispanic origin, and whether the child had a comorbid condition(s). If a parent reported that a child had any of the following diagnosed conditions—Down syndrome, intellectual disability, developmental delay, autism or autism spectrum disorder, learning disability, or current symptoms of seizures, frequent headaches, or stuttering—the child was classified as having a comorbid condition. The conditions selected as comorbidities were chosen because of the inclusion of these conditions in the survey and their association with diagnosed ADHD.[7] The item nonresponse was 1% to 2% for study variables.

Analysis

Weighted analyses using SAS-callable SUDAAN version 11.0.0 (RTI International, Durham, NC) generated estimates of diagnosed ADHD prevalence and the prevalence of

medication and other types of service use as well as corresponding standard errors for these estimates which reflect the complex design of the sample. Chi-square (χ^2) tests were used to examine the association between insurance coverage and various types of service use. When χ^2 testing yielded statistically significant results, additional testing of the significance of pairwise differences was done using Z tests.

For binary outcomes (use of medication for EBD, contact with a mental health professional, contact with a general doctor for EBD, and current receipt of special education services for EBD), adjusted estimates were obtained by using logistic regression with predictive margins with age, sex, race/ethnicity, and presence of comorbidities as independent variables. These variables were chosen based on previous studies, which have shown significant associations between these child characteristics and the use of services for ADHD.[9,14,23] For categorical outcomes (type of provider that first prescribed medication and the categories of mutually exclusive service use [medication, nonmedication services only, and no services]), multinomial logistic regression with predictive margins was used with the same set of independent variables. F tests were used to examine the adjusted association between insurance coverage and various aspects of service use. To determine whether the effect of health insurance differed by age group, interaction terms between health insurance and age were considered for each regression. Poverty status (the ratio of family income to the federal poverty level) was considered, but was not included as a covariate due to the strong association between health insurance coverage and poverty status.

Results

Sample

Between 2010 and 2013, 9.3% of US children aged 4 to 17 were reported by parents to have ever been diagnosed with ADHD. A lower percentage of children with diagnosed ADHD, compared to those without ADHD, were 4 to 5 years old (4.5% vs 15.9%, $P < .001$ for comparison; Table 1). A higher percentage of children with diagnosed ADHD, compared to those without diagnosed ADHD, were 12 to 17 years old (53.8% vs 41.5%, $P < .001$). Also a higher percentage of children with diagnosed ADHD, compared to children without diagnosed ADHD, were boys (70.5% vs 49.0%, $P < .001$) and non-Hispanic white children (65.4% vs 53.3%, $P < .001$). Children with diagnosed ADHD, compared to children without diagnosed ADHD, more often had public health insurance (45.4% vs 34.2%, $P < .001$) and more often had selected comorbid conditions (53.3% vs 13.1%, $P < .001$).

Unadjusted Analyses

Medication Use for EBD Among All Children With Diagnosed ADHD.—Among all children aged 4 to 17 with diagnosed ADHD, 56.0% had used medication for EBD during the past 6 months (Table 2). Among children 4 to 17 years of age without ADHD, 1.3% (confidence interval = 1.2% to 1.5%) had used medication for EBD during the past 6 months (data not shown). Medication use was higher among privately and publicly insured children than uninsured children (57.3% and 57.0% vs 33.1%, $P < .001$ for both).

First Prescriber of EBD Medication.—For nearly three quarters of all children with ADHD (72.9%), the physician who first prescribed medication for a child's EBD was a pediatrician or other family doctor, and for a quarter (24.5%) the first prescriber was a psychiatrist, psychologist, or other mental health professional (Table 2). Having a psychiatrist, psychologist, or other mental health professional as the first prescriber of EBD medication was more common among publicly insured children than privately insured and uninsured children (28.1% vs 22.0% and 14.8%, $P < .05$ for both).

Health Care Contacts and Special Education Use for EBD Among All Children With Diagnosed ADHD.—Among children with diagnosed ADHD, 39.8% had contact with a mental health professional during the past 12 months and 32.2% had contact with a general doctor about the child's EBD during the past 12 months, with 20.4% currently receiving special education services (Table 3). Among children with diagnosed ADHD, contacting a mental health professional was more often reported for children having public insurance than private insurance or no insurance (47.2% vs 34.6% and 24.6%, $P < .001$ for both). Contacting a general doctor about the child's EBD was associated with health insurance coverage in a similar way. Publicly insured children, compared to privately insured and uninsured children, more often had a parent-report of contact with a general doctor about the child's EBD (38.0% vs 27.5% and 25.7%, $P < .001$ and $P < .05$, respectively).

Special education services for EBD were reported more often for publicly insured children (28.0%) compared to both privately insured (13.7%, $P < .001$) and uninsured children (19.1%, $P < .05$; Table 3).

Mutually Exclusive Categories of Use of Medication and Nonmedication Services for EBD Among All Children With Diagnosed ADHD.—Table 4 shows the distribution of all children with diagnosed ADHD across 3 mutually exclusive categories: children using medication for EBD (with or without use of nonmedication services; 56.0%), children only using nonmedication services for EBD (15.1%), and children with no service use (28.9%). A higher percentage of publicly insured (18.7%, $P < .001$), but not uninsured (18.1%), children used only nonmedication services compared to privately insured children (11.6%). Uninsured children were the most likely to have a report of no service use and publicly insured children were the least likely (48.4% vs 24.3%, $P < .001$). Nearly a third (31.1%) of privately insured children received no services ($P < .001$ compared to publicly insured and uninsured children).

Adjusted Analyses

Percentages and results of statistical testing were largely similar in the adjusted and unadjusted analyses. However, in the adjusted analysis, there was no statistically significant difference in the adjusted percentages receiving special education services for EBD between publicly insured children and uninsured children (26.2% vs 20.5%; Table 3). Addition of an interaction term between health insurance and a child's age in the adjusted analysis did not indicate any significant differences across age groups in the use of services by health insurance type (results not shown).

Discussion

While past research studies have shown that children with diagnosed ADHD have a continuing need for mental health services,[35,36] findings from this study indicate that use of mental health services is not universal for this at-risk group of children. Over one quarter (29%) of children had no service use for EBD, despite the broad definition of nonmedication services used here, which included special education services for EBD. Overall, 56% of children with ADHD received medication for their EBD. The higher levels of no service use among uninsured children are compatible with the results of several previous studies, which have documented lower levels of medication use among uninsured children with ADHD.[9,23,37] Findings from this study show that uninsured children, compared to privately and publicly insured children, are less likely to receive other mental health care services for EBD (contact with a mental health professional in the past year) and less likely to receive special education for EBD. We found that these insurance differences persisted even after we controlled for the effects of age, sex, race/ethnicity, and the presence of comorbidities.

We also find differences by the child's type of insurance coverage among those that are insured. Our finding that a higher percentage of publicly insured children, compared to privately insured children, had contact with a mental health professional during the past 12 months supports the results of previous studies, which have described more extensive coverage for child mental health conditions in Medicaid than in many private health insurance policies.[38–40] Additionally, it is interesting to note that, although most children in all insurance categories received their first prescription of medication for EBD from pediatricians or other general doctors, children with public health insurance coverage, compared to children with private or no coverage, were more likely to have received their first prescription of medication from psychiatrists, psychologists, or other mental health professionals.

Although the differences associated with a child's insurance coverage were significant even after controlling for confounding variables, it is unclear whether these differences might be due to variations in other demographic and health characteristics not included in the analysis. In our analysis, we were also unable to adjust for differences in the severity of the child's ADHD symptoms, the presence of other mental health diagnoses, and differences in the preferences and assessments of parents. All these factors influence the type of treatment that parents seek for children with ADHD.[9,41] A higher percentage of children with public insurance had any contact with a mental health professional during the past 12 months, which might suggest differences in access to care. It could not be determined with data from the NHIS whether the need or perceived need for care varied among children in the different health insurance categories. Nonetheless, clear differences in service use exist across insurance groups, with 24% of children with public insurance receiving no services compared to 31% of those with private insurance and 49% of those without insurance coverage.

Our findings are subject to several other limitations. First, assessment of medication and nonmedication service use are based on parent-report, which may be subject to some error, although previous research has suggested that parent-report is a reliable measure of child

mental health service use.[42,43] Additionally, no information was collected about the specific medications or treatments used by the child. Because some children with diagnosed ADHD have other mental health diagnoses, some medication and nonmedication treatments may have been prescribed for EBD caused by these other conditions. However, previous research has shown that psychostimulants and other ADHD medications account for approximately 90% of the medication prescribed for children with ADHD.[22] Information about the use of treatments for any EBD provides a more complete picture of the use of mental health services by children with diagnosed ADHD. Second, the population covered by the NHIS excludes institutionalized populations, which may be important in the assessment of mental health service use. Third, no information is available in the NHIS that allows evaluation of the appropriateness and quality of care received. Finally, the NHIS is a cross-sectional survey, which does not allow us to understand the direction of causality for relationships observed.

During the past 2 decades, data from the NHIS have charted the increase in the prevalence of diagnosed ADHD among children with different types of health insurance coverage. Despite the steady increase in the use of services by children with ADHD, the findings from this study indicate that some children with diagnosed ADHD are not receiving services, and that some groups of insured children with ADHD are significantly less likely to receive particular services identified in this analysis. A higher percentage of uninsured children received no services compared to insured children. We also observed differences among insured children by insurance type in the percentage that were first prescribed medication for EBD by psychiatrists, psychologists, or other mental health professionals. These findings indicate the need for continued national surveillance of mental health service use among children with diagnosed ADHD, especially surveillance that includes information about a child's health insurance coverage.

Authors' Note

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Table 1.

Demographic and Socioeconomic Characteristics of Children Aged 4 to 17 Ever Diagnosed and Never Diagnosed With ADHD: United States, 2010 to 2013.

	Children Ever Diagnosed With ADHD (n = 3504)		Children Never Diagnosed With ADHD (n = 35 021)		
	Percent	SE	Percent	SE	*P* Value of χ^2 Test
Health insurance					
Private	50.1	1.1	58.0	0.5	<.001
Public	45.4	1.1	34.2	0.5	
Uninsured	4.6	0.4	7.8	0.2	
Age (years)					
4-5	4.5	0.5	15.9	0.3	<.001
6-11	41.7	1.1	42.6	0.3	
12-17	53.8	1.1	41.5	0.3	
Sex					
Male	70.5	1.0	49.0	0.3	<.001
Female	29.5	1.0	51.0	0.3	
Race and ethnicity					
Hispanic	14.4	0.7	23.9	0.5	<.001
Non-Hispanic white	65.4	1.0	53.3	0.6	
Non-Hispanic black	14.0	0.7	13.7	0.3	
Non-Hispanic other	6.2	0.5	9.0	0.3	
Comorbidities[a]					
Yes	53.3	1.1	13.1	0.2	<.001
No	46.7	1.1	86.9	0.2	

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; SE, standard error.

[a]A parent-reported diagnosed condition of Down syndrome, intellectual disability, developmental delay, autism, or learning disability, or current symptoms of seizures, frequent headaches, or stuttering.

Table 2.

EBD Medication Use Among All Children Aged 4 to 17 With Diagnosed ADHD (n = 3504) and First Prescriber of EBD Medication Among Children With Diagnosed ADHD Using EBD Medication (n = 1898) by Health Insurance: United States, 2010 to 2013.

	Percent Who Used Medication for EBD During Past 6 Months (n = 1898)	SE	*P* [a]	Percent With Medication First Prescribed by a Pediatrician or Other Family Doctor (n = 1373)	SE	Percent With Medication First Prescribed by a Psychiatrist, Psychologist, or Other Mental Health Professional (n = 453)	SE	Percent With Medication First Prescribed by Another Type of Physician (n = 49)	SE	*P* [a]
Total	56.0	1.0		72.9	1.3	24.5	1.2	2.6	0.5	
Unadjusted results										
Health insurance			<.001							<.01
Private	57.3	1.5		75.2	1.8	22.0	1.8	2.8	0.6	
Public	57.0	1.5		69.5	2.0	28.1	1.9	2.4	0.6	
Uninsured	33.1	4.5		85.0	5.7	14.8	5.7	*c*	–	
Adjusted results [b]										
Health insurance			<.001							<.01
Private	56.4	1.5		75.5	1.8	21.4	1.8	3.1	0.7	
Public	57.9	1.6		69.0	2.1	28.8	2.0	2.1	0.5	
Uninsured	33.5	4.5		84.7	5.7	15.1	5.7	*c*	–	

Abbreviations: EBD, emotional and behavioral difficulties; ADHD, attention-deficit/hyperactivity disorder; SE, standard error.

[a] *P* values are from χ^2 tests for unadjusted values and *F* tests for adjusted values.

[b] Adjusted results are adjusted for age, sex, race/ethnicity, and comorbidities. Comorbidities include a parent-reported diagnosed condition of Down syndrome, intellectual disability, developmental delay, autism, or learning disability, or current symptoms of seizures, frequent headaches, or stuttering.

[c] Unreliable estimate.

Table 3.

Selected Nonmedication Services for EBD for All Children Aged 4 to 17 With Diagnosed ADHD by Health Insurance: United States, 2010 to 2013.

	Contacted a Mental Health Professional During Past 12 Months (n = 1387)			Contacted a General Doctor About Child's EBD During the Past 12 Months (n = 976)			Currently Receives Special Education Services for EBD (n = 780)		
	Percent	**SE**	***p*** [a]	**Percent**	**SE**	***p*** [a]	**Percent**	**SE**	***p*** [a]
Total	39.8	1.1		32.2	1.0		20.4	0.8	
Unadjusted results									
Health insurance			<.001			<.001			<.001
Private	34.6	1.5		27.5	1.5		13.7	1.0	
Public	47.2	1.6		38.0	1.6		28.0	1.4	
Uninsured	24.6	4.1		25.7	5.2		19.1	3.4	
Adjusted results [b]									
Health insurance			<.001			= .001			<.001
Private	35.2	1.6		28.6	1.5		14.6	1.0	
Public	46.4	1.7		36.6	1.6		26.2	1.4	
Uninsured	25.0	4.0		25.5	4.9		20.5	3.3	

Abbreviations: EBD, emotional and behavioral difficulties; ADHD, attention-deficit/hyperactivity disorder; SE, standard error.

[a] *P* values are from χ^2 tests for unadjusted values and *F* tests for adjusted values.

[b] Adjusted results are adjusted for age, sex, race/ethnicity, and comorbidities. Comorbidities include a parent-reported diagnosed condition of Down syndrome, intellectual disability, developmental delay, autism, or learning disability, or current symptoms of seizures, frequent headaches, or stuttering.

Table 4.

Mutually Exclusive Combinations of Medication and Nonmedication Services[a] for EBD Among All Children Aged 4 to 17 With Diagnosed ADHD by Health Insurance: United States, 2010 to 2013.

	Medication (With or Without Nonmedication Services[a]; n = 1898)		Nonmedication Services[a] Only (n = 563)		No Service Use (n = 1002)		
	Percent	SE	Percent	SE	Percent	SE	*P* [b]
Total	56.0	1.0	15.1	0.7	28.9	1.0	
Unadjusted results							
Health insurance							<.001
Private	57.3	1.5	11.6	0.9	31.1	1.4	
Public	57.0	1.5	18.7	1.2	24.3	1.3	
Uninsured	33.1	4.5	18.1	3.3	48.8	4.8	
Adjusted results [c]							
Health insurance							<.001
Private	56.5	1.5	12.8	1.0	30.7	1.4	
Public	58.1	1.6	17.0	1.2	24.9	1.4	
Uninsured	33.5	4.4	18.4	3.3	48.1	4.6	

Abbreviations: EBD, emotional and behavioral difficulties; ADHD, attention-deficit/hyperactivity disorder; SE, standard error.

[a]Nonmedication services are defined as an affirmative answer to questions about having seen or talked to a mental health professional or a doctor because of a child's emotional and behavioral difficulties or having received special education services specifically for emotional and behavioral difficulties.

[b]*P* values are from a χ^2 test for unadjusted values and *F* test for adjusted values.

[c]Adjusted results are adjusted for age, sex, race/ethnicity, and comorbidities. Comorbidities include a parent-reported diagnosed condition of Down syndrome, intellectual disability, developmental delay, autism, or learning disability, or current symptoms of seizures, frequent headaches, or stuttering.