Medication Use in Youth With Autism and Attention-Deficit/Hyperactivity Disorder

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Abstract

Objective: Children with autism spectrum disorder (ASD) may benefit from medication to treat a diverse array of behaviors and health conditions common in this population including co-occurring conditions associated with ASD, such as attention-deficit/hyperactivity disorder (ADHD) and anxiety. However, prescribing guidelines are lacking and research providing national estimates of medication use in youth with ASD is scant. We examined a nationally representative sample of children and youth ages 6 to 17 with a current diagnosis of ASD to estimate the prevalence and correlates of psychotropic medication.

Methods: This study used data from the 2016 and 2017 National Survey of Children's Health. We estimated unadjusted prevalence rates and used multivariable logistic regression to estimate the odds of medication use in children and youth across 3 groups: those with ASD-only, those with ASD and ADHD, and those with ADHD-only.

Results: Two thirds of children ages 6 to 11 and three quarters of youth ages 12 to 17 with ASD and ADHD were taking medication, similar to children (73%) and youth with ADHD-only (70%) and more than children (13%) and youth with ASD-only (22%). There were no correlates of medication use that were consistent across group and medication type. Youth with ASD and ADHD were more likely to be taking medication for emotion, concentration, or behavior than youth with ADHD-only, and nearly half took ASD-specific medication.

Conclusions: This study adds to the literature on medication use in children and youth with ASD, presenting recent, nationally representative estimates of high prevalence of psychotropic drug use among children with ASD and ADHD.

Keywords: attention-deficit/hyperactivity disorder; autism; psychotropic medication

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What's New

Most children and youth with autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD) take a psychotropic medication. More children with ASD and ADHD take medication than children with ASD-only or ADHD-only, suggesting a unique treatment profile and the need for practitioner guidelines.

Autism spectrum disorder (ASD) is a developmental disability characterized by social communication and interaction deficits, restricted and repetitive patterns of behavior, and significant functional impairment. One in 59 eight-year-old children in the United States is estimated to have ASD.[1] Children with ASD may benefit from medication to treat symptoms that commonly co-occur with ASD such as attention-deficit/hyperactivity disorder (ADHD), anxiety, and aggression. However, there are no clear clinical guidelines for prescription medication use among children with ASD, and research providing national estimates of medication use in youth with ASD is scant.

The US Food and Drug Administration (FDA) approved 2 medications for use in people with ASD: risperidone and aripiprazole, in 2006 and 2009, respectively. Both medications are used for the treatment of aggression and irritability. Other off-label medications have been studied for their use in addressing symptoms and co-occurring conditions common in people with ASD such as aberrant social behavior, hyperactivity, repetitive behaviors, cognition, and insomnia.[2] There are no medications approved for core symptoms of ASD, including social communication and interaction deficits. The safety and efficacy of psychotropic medications in children with ASD is largely unknown, and the presentation of complex symptom profiles makes prescription and symptom management a difficult task that is often approached on a case-by-case and trial-and-error basis.

Despite the lack of prescriptions indicated for use in children with ASD, previous studies indicate that psychotropic medication use is common in this population. Studies of specific populations have estimated two thirds of youth with ASD who receive Medicaid take a psychotropic medication,[3,4] while 42% of youth with ASD in the

Simons Simplex Collection had ever taken a psychotropic medication.[5] Twenty-six percent of children in the Autism Treatment Network autism registry were taking at least one psychotropic medication,[6] as were 35% of children in the Interactive Autism Network research database.[7] A study of a commercial claims and encounters database from 2002 showed that 57% of a population of insured children with ASD had at least one prescription for a psychotropic medication filled in that calendar year.[8] The most frequent medication classes were those for ADHD, antidepressants, and mood stabilizers. Smaller clinical samples have also addressed the use of medication use in this group.

There are limited estimates of the prevalence of the use of medication in children with ASD from nationally representative research. The most recent estimates are from the 2001 National Longitudinal Transition Study and were only generalizable to youth in secondary school receiving special education services. This study found that 34% of youth with ASD who did not have ADHD and 58% of youth with ASD who had ADHD were taking one or more psychotropic medications.[9] For context, around half of children with ASD are thought to have a co-occurring diagnosis of ADHD.[10–13] Treatment for ADHD with medication is well established, and medication is successfully used to treat impulsivity, inattention, and hyperactivity in children with ASD.[13] While these studies began to illuminate the high use of medication in this population, and revealed differences in use by co-occurring conditions, they are limited in utility as they do not generalize to a larger population and they rely on outdated data. Population level research that provides more recent estimates can help to drive understanding of the population of children with ASD that use medication, which has implications for guiding national policy and practice guidelines.

To address gaps in the understanding of medication use, the current study will present recent, nationally representative findings of the prevalence of parent-reported psychotropic medication use in children with a current diagnosis of ASD. To do this, we will use data from the National Survey of Children's Health (NSCH) which provides a unique opportunity to study the prevalence of medication use in children with special health care needs. We will consider the use of medication separately for youth with ASD with and without ADHD. We will also present results for youth with ADHD but not ASD as a point of comparison.

Specifically, we aim to

1. Describe parent-reported rates of medication use in children and youth with ASD and or ADHD ages 6 to 17.
2. Examine correlates of medication use for children and youth with ASD and or ADHD ages 6 to 17.
3. Differentiate medication use for ASD symptoms, ADHD symptoms, and emotion, concentration, or behavior in children and youth with ASD and or ADHD.

METHODS

This study used data from the NSCH, combining data from study years 2016 and 2017 to increase sample size and utilize the most recent data available at the time of this study.[14] The NSCH, designed by the Health Resources and Services Administration's Maternal and Child Health Bureau and conducted by the US Census Bureau, is a cross-sectional, nationally representative survey designed to provide national information estimates on the health and well-being of children from parent or caregiver report.[15–17]

OUTCOME OF INTEREST: MEDICATION USE

Parents were asked questions about the use of ASD-specific medication ("Is this child currently taking medication for autism, ASD, Asperger's disorder, or PDD?"), ADHD-specific medication ("Is this child currently taking medication for ADD or ADHD"), and medication for emotion, concentration, or behavior ("During the past 12 months, has this child taken any medication because of difficulties with his or her emotions, concentration, or behavior?"). Children with ADHD-only were not asked about ASD-specific medication, and children with ASD-only were not asked about ADHD-specific medication. We note that while there are medications approved for use in children with ASD by the FDA, there are no approved medications for the core symptoms of ASD. All children were asked about medication use for emotion, concentration, or behavior. We created a variable that marked if the parent reported yes to any of the 3 medication questions to capture any psychotropic medication use.

INDEPENDENT VARIABLES AND COVARIATES

We organized our conceptualization of covariates using Andersen's model of Health Care Utilization. The Andersen model focuses on contextual and individual determinants of health to improve access to care,[18] and is widely used in research relating to health care service use. This model clusters predictors of health care use into 3 main groups: predisposing factors (factors or conditions that influence an individual's propensity to use services), enabling factors (conditions that help or hinder service use), and need factors (aspects of health impairment that require medical services). The Andersen model captures the person-in-environment component of health care and medication and considers a wide range of factors that influence service use across multiple levels of analysis, while providing a broad framework for assessing population-level differences.

Predisposing factors in this study included gender, race, Hispanic ethnicity, primary language spoken in the household, family structure, and age. Family structure was a categorical variable that assessed the identity and relationship of caregivers in the household. In bivariate analysis, we stratified by age in 2 groups: children ages 6 to 11 and youth ages 12 to 17. In multivariate analysis, we included age as a continuous indicator by year of child age. Enabling factors included insurance status as private, public, both, or uninsured; and highest level of parent

education as less than a high school degree, high school degree, or additional education beyond a high school degree. Need factors included parent-reported current diagnosis of another mental, behavioral, or developmental disorder (MBDD); how well youth could share ideas and things that were important to them; and if the youth had serious difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional condition. Other MBDDs included parent endorsement of current "depression," "anxiety problems," "behavioral or conduct problems," "Tourette syndrome," "learning disability," "intellectual disability (also known as mental retardation)," "developmental delay," and "speech or other language disorder."

Data Analysis

Beginning in 2016 NSCH survey years could be combined to perform analysis. Combining both data years, there were 1493 children (ages 6−11) and youth (ages 12−17) with parent report of current ASD from a health care provider ("autism or ASD, Asperger's disorder or pervasive developmental disorder [PDD]"). There were 5901 children and youth with parent report of current diagnosis of ADHD from a health care provider ("attention deficit disorder or attention deficit/hyperactivity disorder, that is, ADD or ADHD"). ASD and ADHD diagnosis are not confirmed by clinical report; however, prevalence findings from the NSCH are similar to estimates of national prevalence obtained through other surveillance methods, including the Autism and Developmental Disabilities Monitoring network.[19]

To describe the sample, we presented estimates of proportions and means of the independent variables and compared these between children and youth with ASD-only (parent report of current ASD but no report of current ADHD), ASD + ADHD (parents report of both current ASD and ADHD, and ADHD-only (parent report of current ADHD but no parent report of current ASD). We used logistic regression to compare the distribution of variables across the groups.

To address the first research aim, we estimated the prevalence of psychotropic medication use based on parent report. We presented prevalence estimates for children and youth with current parent report of ASD + ADHD, ASD-only, and ADHD-only. We estimated prevalence separately for children ages 6 to 11 and youth ages 12 to 17. We then used multivariable logistic regression to assess the odds of medication use for children and youth with ASD + ADHD compared to ASD-only, controlling for all independent variables, ADHD-only compared to ASD-only, and ASD + ADHD compared to ADHD-only. These adjusted models showed the odds of medication use in each group compared to the referent group. This analysis was done for children and youth ages 6 to 17 and not separated by age.

To address the second research aim, we used multivariable logistic regression to assess correlates of medication use for children and youth with ASD-only, ASD + ADHD, and ADHD-only. Each model included all predisposing, enabling, and need factors as covariates. These analyses were done for children and youth ages 6 to 17 and not separated by age, as age was a covariate of interest in each model.

To address the third aim, we estimated the prevalence of medication use for each of the 3 parent-reported medication questions (ASD-specific medication, ADHD-specific medication, and medication for emotion, concentration, or behavior) for all 3 groups, as applicable. We presented estimates by 2 age groups and made statistical comparisons using logistic regression.

All analyses were done in Stata 15 to control for the complex sampling procedure of the NSCH.[20] All variables were missing fewer than 5% of observations and we did not perform missing data estimation procedures. To ensure adequate sample size for reliable inference, we calculated the relative standard error of estimates (RSE) by dividing the standard error by the proportion estimate and did not report estimates with a RSE greater than 50%. Estimates with an RSE greater than 30% were noted.

Results

As seen in Table 1, most children and youth with ASD-only were male (84%), white (65%), and lived in a 2-parent household (78%) where English was the primary language (83%). Children and youth with ASD-only were very similar in demographic and household characteristics to children and youth with ASD + ADHD, but were more often male, of other or multiple races, of Hispanic ethnicity, and in a household where a language other than English was primarily spoken than children and youth with ADHD-only. Children and youth with ASD-only were less likely to have a diagnosis of a co-occurring MBDD besides ASD or ADHD (83%) than children and youth with ASD + ADHD (96%), but more likely to have a co-occurring diagnosis of an MBDD than children and youth with ADHD-only (71%). Similarly, they were less likely to have reported serious difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional condition (63%) than children and youth with ASD + ADHD (80%) and more likely than children and youth with ADHD-only (50%).

Aim 1

Table 2 shows estimates of medication use for children ages 6 to 11 and youth ages 12 to 17. Children with ASD + ADHD were much more likely to have taken a medication for ASD than children with ASD-only (68% compared to 13%), as were children with ADHD-only (73%). A similar pattern was seen in youth. There was no significant different in the proportion of children and youth with ASD + ADHD and children and youth with ADHD-only taking psychotropic medication. In adjusted comparisons (Table 3), children and youth with ASD + ADHD had 16 times the odds of medication of children and youth with ASD-only when controlling for all covariates. Similarly, children and youth with

Table 1. Characteristics of Youth With ASD and Youth With ADHD

	ASD-Only (n = 755)		ASD and ADHD (n = 738)		ADHD-Only (n = 5163)	
	Percentage with ASD-only having factor (95% CI)		Percentage with ASD and ADHD having factor (95% CI)		Percentage with ADHD-only having factor (95% CI)	
Predisposing factors						
Gender, male	84.4	(78.2, 89.2)	75.0	(63.1, 84.1)	67.4***	(64.5, 70.2)
Race						
White	65.0	(52.7, 75.6)	67.1	(56.2, 76.4)	69.0	(66.0, 72.0)
African American	10.9	(6.5, 17.5)	15.5	(10.5, 22.4)	18.0	(15.3, 21.0)
Other or multiple races	24.1	(14.5, 37.4)	17.4	(9.2, 30.6)	12.9*	(11.1, 15.0)
Hispanic ethnicity	39.2	(26.8, 53.2)	24.4	(14.5, 38.0)	17.4***	(14.9, 20.1)
Family structure						
Two parent biological or adoptive	69.6	(60.1, 77.6)	56.7*	(47.8, 65.3)	48.4***	(45.6, 51.3)
Two parent step-family	8.0	(4.5, 13.8)	8.3	(5.6, 12.1)	13.7	(11.8, 15.8)
Mother only household	16.1	(10.9, 23.2)	26.2*	(19.7, 33.9)	25.0*	(22.2, 28.0)
Other structure	6.3	(3.6, 10.9)	8.8	(5.4, 13.9)	12.9*	(11.2, 15.0)
Mean age	11.4	(10.7, 12.2)	11.9	(11.4, 12.3)	12.0	(11.8, 12.1)
Household as a percentage of the federal poverty level (FPL)						
<100% FPL	33.9	(21.6, 48.7)	24.3	(18.0, 32.1)	23.2	(20.5, 26.3)
100%–199% FPL	22.6	(14.9, 32.7)	29.9	(20.0, 42.3)	23.0	(20.6, 25.6)
200%–399% FPL	22.6	(16.7, 29.8)	21.6	(16.5, 27.6)	23.7	(21.5, 26.1)
>400% FPL	21.0	(15.6, 27.6)	24.2	(18.8, 30.5)	30.0*	(27.6, 32.5)
Enabling factors						
Type of health insurance						
Public only	44.7	(32.9, 57.2)	47.1	(37.7, 56.7)	40.4	(37.4, 43.5)
Private only	38.4	(29.4, 48.2)	37.3	(29.6, 45.6)	48.2	(45.3, 51.1)
Private and public	10.7	(7.2, 15.5)	13.0	(6.9, 23.4)	7.0	(5.7, 8.5)
Not insured	6.2	(1.7, 20.2)	2.6	(1.2, 5.7)	4.4	(3.3, 5.9)
Highest level of parent education						
Less than high school	8.6	(1.9, 31.5)	18.1	(9.3, 32.3)	7.2	(5.0, 10.2)
High school graduate	25.6	(16.8, 36.9)	22.7	(15.2, 32.5)	22.2	(19.6, 25.0)
More than high school	65.8	(52.1, 77.3)	59.2	(48.3, 69.3)	70.6	(67.3, 73.7)
Need factors						
Diagnosis with a mental, behavioral, or developmental disorder other than ASD or ADHD†	82.7	(72.7, 89.6)	95.8***	(92.4, 97.7)	71.2*	(68.4, 73.8)
How well can you and this child share ideas or talk about things that really matter?						
Very well	24.1	(17.4, 32.4)	21.5	(15.9, 28.4)	53.9***	(50.9, 56.8)
Somewhat well	39.4	(28.2, 51.8)	46.9	(37.6, 56.5)	36.6	(33.8, 39.4)
Not very well	19.5	(13.6, 27.3)	21.5	(16.0, 28.3)	8.6***	(7.3, 10.1)
Not at all	16.9	(8.0, 32.2)	10.0	(4.4, 21.4)	1.0***	(0.6, 1.6)
Serious difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional condition	62.9	(52.0, 72.6)	80.3**	(73.7, 85.6)	50.3*	(47.3, 53.2)

CI indicates confidence interval; ASD, autism spectrum disorder; and ADHD, attention-deficit/hyperactivity disorder.
Statistical comparisons made to the ASD no ADHD group.
*$P < .05$.
**$P < .01$.
***$P < .001$.
†Other Mental, Behavioral, or developmental disorders (MBDDs) include "depression," "anxiety problems," "behavioral or conduct problems," "Tourette syndrome," "learning disability," "intellectual disability (also known as mental retardation)," "developmental delay," and "speech or other language disorder".

ADHD-only had 14 times the odds of medication use of children and youth with ASD-only.

AIM 2

There was no factor that was consistently associated with medication use across groups (Table 4). Some predisposing and need factors were associated with medication use in all children. Parent report of serious difficulty concentrating was positively associated with medication use in children and youth with ASD + ADHD and ADHD-only. Female gender was negatively associated with use of medication in children and youth with ASD + ADHD. Age was associated with significantly higher odds of medication use in children with ASD-only. Race and ethnicity, family structure, and type of insurance were not associated with medication use.

AIM 3

Half of children (50%) and youth (47%) with ASD + ADHD took ASD-specific medication (Table 5). Children and youth with ASD + ADHD were just as likely to take ADHD-specific medication as children and youth

Table 2. Unadjusted Comparisons of Medication Use Children With ASD With and Without ADHD, and Children With ADHD Without ASD

	Use of psychotropic medication			
	Ages 6–11		Ages 12–17	
	%	95% CI	%	95% CI
ASD-only	13.02	(7.81, 20.90)	21.91	(14.42, 31.87)
ASD+ ADHD	67.69*	(47.41, 82.96)	75.75*	(66.03, 83.38)
ADHD-only	73.37*	(69.52, 76.89)	70.04*	(66.27, 73.55)

ASD indicates autism spectrum disorder; ADHD, attention-deficit/hyperactivity disorder.
These are weighted percentages. Note: the medication variables are all missing fewer than 2% of observations for all groups.
Statistical comparisons made to the ASD-only group.
*$P < .001$.

Table 3. Adjusted Comparison of Medication Use Between Children Ages 6 to 17 With ASD With and Without ADHD, and Children With ADHD-only

	Use of Psychotropic Medication	
	Adjusted OR	(95% CI)
ASD-only versus ASD + ADHD	15.51	9.38, 25.64
ASD + ADHD versus ADHD-only	0.68	0.41, 1.12
ASD-only versus ADHD-only	13.73	9.25, 20.37

OR indicates odds ratio; CI, confidence interval; ASD, autism spectrum disorder; and ADHD, attention-deficit/hyperactivity disorder.
Each column is a multivariable logistic regression that controls for all variables seen in Table 1.

Table 4. Correlates of Medication Use in Children With ASD-Only, ASDH + ADHD, and ADHD-Only

	ASD-Only Took Medication	ASD and ADHD Took Medication	ADHD-Only Medication
Predisposing factors			
Gender, female	0.83 (0.40, 1.72)	0.30 (0.15, 0.61)	0.86 (0.65, 1.15)
Race			
White			
African American	0.52 (0.15, 1.83)	0.49 (0.19, 1.29)	1.25 (0.77, 2.03)
Other or multiple races	0.61 (0.23, 1.63)	0.51 (0.21, 1.24)	0.90 (0.61, 1.31)
Hispanic Ethnicity	0.61 (0.22, 1.70)	0.56 (0.24, 1.31)	0.79 (0.55, 1.15)
Family structure			
Two parent biological or adoptive			
Other structure	0.97 (0.43, 2.17)	1.00 (0.46, 2.20)	0.98 (0.74, 1.30)
Age	1.11 (1.01, 1.23)	1.09 (0.97, 1.23)	1.00 (0.96, 1.04)
Household as a percentage of the federal poverty level (FPL)			
<100% FPL			
100%–199% FPL	1.92 (0.53, 6.95)	0.91 (0.32, 2.57)	1.29 (0.84, 1.98)
200%–399% FPL	1.64 (0.47, 5.74)	2.00 (0.54, 7.41)	1.37 (0.91, 2.06)
>400% FPL	3.35 (0.85, 13.14)	2.09 (0.54, 8.04)	1.71 (1.11, 2.64)
Enabling factors			
Type of health insurance			
Public only			
Private only or private and public	0.97 (0.35, 2.64)	0.92 (0.33, 2.56)	0.78 (0.56, 1.09)
Not insured	0.90 (0.23, 3.51)	0.46 (0.05, 3.88)	0.71 (0.39, 1.31)
Highest level of parent education was more than high school	0.99 (0.97, 1.01)	1.04 (1.01, 1.06)	1.00 (0.99, 1.01)
Need factors			
Diagnosis with a mental, behavioral, or developmental disorder other than ASD or ADHD†	6.00 (1.77, 20.35)	1.11 (0.28, 4.32)	1.10 (0.82, 1.47)
How well can you and this child share ideas or talk about things that really matter?			
Very well			
Somewhat well	0.66 (0.27, 1.62)	1.07 (0.51, 2.28)	1.16 (0.89, 1.52)
Not very well or not at all	1.44 (0.56, 3.71)	3.78 (1.38, 10.33)	0.69 (0.45, 1.05)
Serious difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional condition	1.60 (0.76, 3.34)	2.83 (1.35, 5.94)	3.07 (2.33, 4.04)

ASD indicates autism spectrum disorder; ADHD, attention-deficit/hyperactivity disorder.

Table 5. Unadjusted Comparisons of Medication Use by Children With ASD With and Without ADHD, and Children With ADHD Without ASD

	Percentage of Children With Current Use of ASD-Specific Medication				Percentage of Children With Current Use of ADHD-Specific Medication				Percentage of Children With Use of Medication for Emotion, Concentration, or Behavior in the Past 12 Months			
	Ages 6–11		Ages 12–17		Ages 6–11		Ages 12–17		Ages 6–11		Ages 12–17	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
ASD-only	9.54	(5.44, 16.20)	13.74	(8.32, 21.86)					9.78	(5.72, 16.22)	19.64	(12.94, 28.65)
ASD+ ADHD	49.74*	(33.79, 65.74)	47.29*	(38.48, 56.27)	61.65	(43.26, 77.22)	65.80	(56.01, 74.41)	65.69*	(45.98, 81.16)	74.36*	(64.79, 82.05)
ADHD-only					68.28	64.28, 72.20	61.13	(57.19, 64.92)	67.22*	(63.09, 71.10)	62.97*	(59.04, 66.73)

CI indicates confidence interval; ASD, Autism Spectrum Disorder; and ADHD, attention-deficit/hyperactivity disorder.
Statistical comparisons made to the ASD-only group.
*$P < .001$.

with ADHD-only. However, significantly more youth with ASD + ADHD took medication for emotion, concentration, or behavior (74%) than youth with ADHD-only (63%). There was no difference in medication use in children (ages 6−11) with ASD + ADHD or ADHD-only.

DISCUSSION

This study provides national point estimates of medication use among children and youth with ASD-only, ASD + ADHD, and ADHD-only. Three quarters of youth ages 12 to 17 with ASD + ADHD were taking at least 1 psychotropic medication, similar to youth with ADHD-only (70%) but more than youth with ASD-only (22%). Further investigation revealed high rates of ASD-specific medication in this group (47%), as well as rates of medication for emotion, behavior, or concentration that were higher than seen in youth with ADHD-only (74% vs 63%). The high use of psychotropic medication in children and youth with ASD + ADHD suggests that they represent a distinct profile of need within the heterogeneous autism spectrum, as well as need beyond youth with ADHD-only.

The high use of medication to treat ASD is of particular note. While ADHD is common in children with ASD, ADHD is not considered a symptom of ASD. Therefore, medication taken to treat ADHD should not be considered a treatment for ASD.[21] As such, the high use of medication to treat ASD in children with ASD + ADHD is provocative. One hypothesis for the high rates is that parents incorrectly endorsed this survey question because their child used medication to treat ADHD. Another explanation is that polypharmacy is high in this group and the child is taking many medications to treat different symptoms. Presence of co-occurring medical conditions is common in children with ASD, and these conditions may themselves be treated with psychotropic medication.[22] Another possible explanation is the phenomenon of diagnostic overshadowing. Diagnostic overshadowing in people with mental health conditions often leads to underdiagnosis of other conditions, with misattribution of symptoms to the mental health condition itself.[23,24] Children with ASD may have a higher barrier for a clinical diagnosis of ADHD, requiring more severe symptoms to obtain a diagnosis. Greater severity could lead to higher rates of medication use in children diagnosed with ASD + ADHD compared to those with ADHD-only. Future research should explore the differing medical and clinical needs of children and youth with ASD + ADHD and ASD-only.

This study was largely consistent with previous findings of high usage of psychotropic medications in children and youth with ASD, while higher use was seen in those with ASD + ADHD.[9,25] Comparison is made difficulty by the great range of previous estimates. Yet many of these differences may be explained by sample characteristics and available data (eg, Medicaid recipients and research registry participants may differ in a meaningful way from the general population).

The strong association previously found with age and medication use was not observed in this study.[5] Using the age of 6 years as the lower bound may have precluded the youngest group that is the least likely to receive medication and may have been driving previous associations.

There are few studies that investigate the safety and effectiveness of psychotropic medication use in children with ASD. While medication use appears common, as does polypharmacy, the long-term effects of medication use are largely unknown.[2] However, side effects of these medications are documented, and their use may be contraindicated in some situations.[26] Particularly in young children, the effects of medications on development have not been well studied. Furthermore, it is largely unknown if the use of medication for ADHD and other symptoms in children with ASD is as efficacious as its use in children without ASD. These questions are important to study, as these medications are being used widely in practice as documented by our findings.

Although the aim of this study was to produce national estimates of medication use, there are several notable limitations to this work. In the current study, we considered use of medication specifically taken to treat ASD, as well as medication for ADHD and for emotions, concentration, or behavior. However, the current study does not include specific medication types taken to address these symptoms. This is a limitation of the data. The specific medication, number of medications, and frequency and amount are not known. The information about medication use is collected from parent report, which may be a less reliable measure of medication use and medication type than medical records or claims information. Furthermore, use of medication was relatively uncommon in youth with ASD-only, so estimates by year of age were not stable and not reported.

The strengths from this study are also notable. Data come from a large, nationally representative sample of children in the United States and are thus generalizable to the population of noninstitutionalized children. The data are recent, with surveys conducted in 2016 and 2017. The ability to differentiate reasons for medication (for ASD, ADHD, or emotion, concentration or behavior) helps alleviate the lack of specific medication types. Finally, ability to account for co-occurring ADHD is important, as ADHD is commonly treated with medication in children, and ADHD is a common co-occurrence in children with ASD.

Conclusions

This study adds to the literature on medication use in children and youth with ASD, presenting recent, nationally representative estimates of prevalence of psychotropic drug use and the correlates of use. It examined reasons for medication use in children and youth with ASD + ADHD to determine need for ASD beyond the symptoms of ADHD. The high use of medication in youth with ASD + ADHD is noteworthy, particularly medication used to treat ASD, as no medications are approved by the FDA for the core symptoms of ASD. Children and youth with ASD + ADHD present a unique profile of symptoms that are often being treated by psychotropic medication.

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