

Multiple Psychotropic Medication Use for Youths: A Two-State Comparison

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ABSTRACT

Objective: The aim of this study was to compare multiple psychotropic use among youths enrolled in two U.S. mid-Atlantic state Medicaid and state Children's Health Insurance Programs (SCHIP).

Methods: Administrative data were used to examine multiple psychotropic use among youths less than 20 years of age and who were continuously enrolled in Medicaid or SCHIP programs in two states during 1999. Multiple psychotropic use referred to multiclass combinations and was defined by the number of months of multiple use. Main outcome measures were the prevalence of multiple psychotropic use and months of multiple use. Demographic and clinical characteristics, mental health visits, and common combinations were examined according to months of multiple use.

Results: Among continuously enrolled youths, 21%–22% had at least one mental health-related visit, 8%–10% received a psychotropic medication, and 2%–3% received multiple psychotropic medications. Nearly one third (28%–30%) of youths with any psychotropic use received multiple medications, of which almost half was for 5–12 months. Multiclass use was more common in male, white, aged 10–14, disabled, and foster-care youths. Stimulants with antidepressants, antipsychotics, or alpha-agonists were the most common combinations.

Conclusions: Multiple use occurred in nearly one third of youths with any psychotropic treatment. Additional research is needed to investigate switching patterns and the effectiveness of combined pharmacotherapy.

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INTRODUCTION

MULTIPLE PSYCHOTROPIC TREATMENTS for youths are becoming more prominent. At least two studies based on Medicaid administrative data have reported multiple psychotropic use among children (Martin et al. 2003; Rushton and Whitmire 2001); however, one study only examined stimulant and antidepressant use (Rushton and Whitmire 2001). From 1987 through 1998, multiple psychotropic utilization increased five- to eight-fold among the general child population and 2.5-fold among psychotropic-medicated children (Safer et al. 2003). Differences in utilization by age (Rappley et al. 2002), gender, physician specialty, and insurance coverage (Martin et al. 2002; Safer et al. 2003) have been noted. Diagnostic complexity and duration of psychotropic treatment are two potentially important factors related to the care children are receiving in community settings (Shireman et al. 2002; Warner et al. 2004). Studies of multiple psychotropic use generally have involved youth with attention-deficit/hyperactivity disorder (ADHD) (Bhatara et al. 2002; Rushton and Whitmire 2001; Safer et al. 2003) or aggressive behavior (Connor et al. 1997; Safer et al. 2003).

The limited number of studies on multiple psychotropic treatments have not addressed several issues that merit further investigation. Firstly, while several reports have noted the occurrence of multiple psychotropic use among children, they did not examine the duration of multiple use. Secondly, variation in multippsychotropic regimens according to demographic characteristics has been noted, but, to our knowledge, none have examined diagnostic complexity in relation to other mental health services. Thirdly, there are no multistate comparisons of multiple psychotropic use among youths; thus, it is unclear to what degree such patterns are common across different states and programs.

To address these specific gaps in the literature, a comparison of multiple psychotropic treatment patterns for youths under 20 years of age across two state Medicaid and the State Children's Health Insurance Program (SCHIP) programs was undertaken to: (a) as-

sess the prevalence of multiple psychotropic medication use in 1999; (b) compare the demographic and clinical characteristics in relation to the duration of multiple psychotropic use; and (c) examine the most common multiple psychotropic combinations in relation to duration of use. For consistency throughout this paper, the term *youths* refers to children and adolescents.

METHODS

Study design

Administrative data were used for a 1-year cross-sectional study of multiple psychotropic use in 1999 among continuously enrolled youths in two mid-Atlantic states' Medicaid or State Children's Health Insurance Programs (SCHIP). The Johns Hopkins Bloomberg School of Public Health, the University of Maryland, and each State Medicaid Administration's Institutional Review Boards approved the study.

Study population

This study included all children who were under 20 years of age, continuously enrolled in Medicaid or SCHIP, and had at least one mental health-related encounter in 1999. Mental health-related encounters were based on claims that met at least one of the following criteria: (a) a medical encounter claim with an *International Classification of Disease 9th Revision (ICD-9)* mental disorder code or a Current Procedures and Terminology (CPT) psychiatric procedure code; or (b) a pharmacy claim for a psychotropic medication.

Data sources

Data were derived from computerized administrative claims representing medical visits to health-care providers and medications dispensed from outpatient community pharmacies for Medicaid and SCHIP enrollees. In addition, enrollment files were used to obtain information on the individual's age, gender, race or ethnicity, enrollment dates, and eligibility

category. Eligibility category referred to those in foster care or who met federal qualifications for assistance through disability, those in households whose income was below the federal poverty level, or those who qualified for SCHIP.

Clinical characteristics of visits to health-care providers were derived from the medical encounter claims. Using ICD-9 codes, psychiatric disorders were classified as ADHD, adjustment, anxiety, autism, bipolar, conduct disorder, depression, developmental disability, learning disability, mental retardation, oppositional defiant disorder, personality disorders, psychoses, substance abuse, and tic disorders. All other mental health diagnoses comprised the "other psychiatric disorder" category. Mental health-related procedures included: CPT codes 90801 through 90899; methadone drug-level testing; psychological testing; and state-specific codes for individual or group mental health treatments, substance abuse counseling/services, psychiatric rehabilitation, residential treatment behavioral therapy, and psychiatric day treatment.

Psychotropic use was based on pharmacy claims data. Medications were organized into major psychotropic classes, including stimulants, antidepressants, antipsychotics, antiparkinsonian, sedative/hypnotics, anxiolytics, anticonvulsants, and lithium. Subclass analyses included selective serotonin reuptake inhibitors (SSRI), the tricyclic antidepressants (TCA), and other antidepressants. Mood-stabilizing anticonvulsant medications commonly used in psychiatry were examined separately (i.e., carbamazepine, valproic acid, gabapentin, lamotrigine, and oxcarbazepine).

Multiple psychotropic class measure

Claims for medications from different psychotropic classes were the basis for identifying multiple use. This was quantified as months of multiple use, which referred to the use of two or more different psychotropic classes within the *same month*. To avoid small cell sizes, three mutually exclusive categories were created: 1, 2-4, and 5-12 months of multiple use.

Because data on alpha-agonist use was only available from State B, a comparison of this class between states was not possible. However, because these agents are often used in combination with stimulants for the treatment of youth with ADHD, it was important to examine how estimates of multiple psychotropic use may have changed with the inclusion of alpha-agonists as an additional psychotherapeutic class. Thus, for State B, a subgroup analysis of months of multiple psychotropic use with and without the inclusion of alpha-agonists was conducted.

Analytic plan

Descriptive measures were used to characterize the population prevalence and multiple-class use among those with any mental health-related visit. Because the large sample size would result in significant findings for small differences across states, and there was inadequate control of variation resulting from differences in state policies, statistical tests were not conducted. All data were summarized using SAS® (SAS Institute Inc., Cary NC).

RESULTS

Population characteristics

The demographic characteristics of continuously enrolled individuals under 20 years of age across the two states are displayed in Table 1, and are similar across states. Because over 70% of the child population was continuously enrolled, the demographic characteristics of this subset resemble all child and adolescent enrollees. In general, there were equal proportions of males and females; the majority was African-American, under 10 years of age, and eligible through low-income qualifications, such as temporary assistance to needy families (TANF). SCHIP enrollment in State A only began in 1999; thus, it represents a small proportion of the population. Even so, the combined low-income and SCHIP groups constitute 86.3% (State A) and 86.8% (State B) of the popula-

TABLE 1. DESCRIPTION OF THE CONTINUOUSLY ENROLLED YOUTH POPULATION IN 1999

Demographic characteristics	State A		State B	
	n	%	n	%
Total	40,856	100	235,093	100
Gender				
Male	20,414	50.0	114,881	48.9
Female	20,442	50.0	120,212	51.1
Race [^]				
White	14,522	35.5	69,584	29.6
African-American	21,337	52.2	143,726	61.1
Hispanic	3,759	9.2	11,877	5.1
Other	729	1.8	3,762	1.6
Age				
<5 years	12,819	31.4	75,539	32.1
5-9 years	12,094	29.6	70,559	30.0
10-14 years	9,101	22.3	53,666	22.8
15-19 years	6,842	16.7	35,329	15.0
Aid category				
Disabled	4,345	10.6	16,848	7.2
Foster care	1,271	3.1	14,125	6.0
Low income	34,727	85.0	118,697	50.5
SCHIP*	513	1.3	85,423	36.3

[^]Missing race data for 509 (1.3%) in State A & 6144 (2.6%) in State B; *SCHIP, State Children's Health Insurance Program.

tion, whereas foster care in State B was twice that of State A.

Characteristics of children receiving mental health care

Approximately one fifth of the population had at least one mental health-related encounter in 1999 (Table 2). Compared to the enrolled population, those with mental health service use were mostly male, white, 5-14 years of age, disabled, or in foster care. Across states, the relative ratio of male to female mental health users was 1.7:1, and corresponding relative ratios for white to African-American were 1:5:1 (State A) and 1:4:1 (State B). A small proportion had any psychotropic management or psychotherapy visit.

The prevalence of psychotropic medication use was also similar across states (Table 2). Overall, 10% (State A) and 8% (State B) received at least one psychotropic agent during the year, which is higher than 1996 estimates of 6% (Zito et al. 2003). Although there was an 18%-23% greater use of stimulants, antipsychotics, and anticonvulsants in State A than State B, antidepressant use was similar (3.0% State A; 2.7% State B).

Of the continuously enrolled cohort with at least one mental health-related encounter in 1999, less than half (39%-47%) received a psychotropic medication. Over 90% of antidepressant use comprised SSRIs (i.e., fluoxetine, sertraline, paroxetine, fluvoxamine, citalopram) and other antidepressants (i.e., venlafaxine, trazodone, nefazodone, bupropion, mirtazepine). Notably, 73%-79% of all anticonvulsant use involved mood-stabilizing agents.

Multiple psychotropic use

The prevalence of multiple psychotropic use ranged from 2.4% to 2.9% (Table 2). Nearly all of the multiple psychotropic use occurred within the same month (State A, 86.6%; State B, 91.4%). As a proportion of youths who received psychotropic medication (4215 in State A and 18,841 in State B), nearly 28%-30% had multiple psychotropic use. This included 6%-7% with 1 month, 9% with 2-4 months, and 12%-14% with 5-12 months of use.

Table 3 displays comparisons of demographic, diagnostic, and mental health service use characteristics between those with 2-4 and 5-12 months of multiple use. The prevalence was higher for 5-12 months of use among males, whites, older youths, and the disabled. In State A, there was very little difference among youths in foster care with 2-4 or 5-12 months of multiple use, but in State B multiple use among youths in foster care with 5-12 months was more than twice that of those with 2-4 months of use. The rate of psychiatric disorders was higher among those with a longer duration of multiple psychotropic use. A higher rate of visits for psychotropic management and psychotherapy was also observed for those with longer du-

TABLE 2. PREVALENCE OF MENTAL HEALTH-RELATED SERVICES AMONG YOUTHS IN 1999

Demographics and mental health services	State A		State B	
	<i>n</i>	<i>Prevalence per 100</i>	<i>n</i>	<i>Prevalence per 100</i>
Total	8953	21.9	48,080	20.5
Gender				
Male	5614	27.5	29,985	26.1
Female	3339	16.3	18,095	15.1
Race [^]				
White	4059	27.9	18,099	26.0
African-American	4074	19.1	27,689	19.3
Hispanic	624	16.6	1109	9.3
Other	101	13.9	354	9.4
Age				
<5 years	914	7.1	5915	7.8
5-9 years	3286	27.2	17,395	24.7
10-14 years	2914	32.0	17,017	31.7
15-19 years	1839	26.9	7,753	21.9
Aid category				
Disabled	2803	64.5	10,068	59.8
Foster care	699	54.9	5683	40.2
Low income	5378	15.5	21,751	18.3
SCHIP*	73	14.2	10,578	12.4
Psychotropic use				
Total	4215	10.3	18,841	8.0
Stimulant	2750	6.7	12,029	5.1
Antidepressant	1242	3.0	6322	2.7
SSRI [^]	781	1.9	3885	1.7
TCA [^]	208	0.5	1410	0.6
Other antidepressants	415	1.0	2188	0.9
Anticonvulsant	883	2.2	4213	1.8
Mood-stabilizer	648	1.6	3331	1.4
Antipsychotic	716	1.8	3166	1.4
Anxiolytic	403	1.0	1483	0.6
Sedative/Hypnotic	106	0.3	385	0.2
Lithium	53	0.1	675	0.3
Antiparkinson	48	0.1	394	0.2
Mental health services				
Psychotropic management	882	2.2	7220	3.1
Psychotherapy	1554	3.8	12,910	5.5
Multiple Psychotropic uses [§]				
Total	1176	2.9	5588	2.4
1 month	282	0.7	1172	0.5
2-4 months	386	0.9	1707	0.7
5-12 months	508	1.2	2709	1.2

[^]Missing race data: State A: 95 (18.7%) and State B: 829 (13.5%); *SCHIP, State Children's Health Insurance Program; [§]Those with psychotropic use but no months of multiple use = State A: 3,039 (7.4%) and State B: 13,253 (5.6%); [^]SSRI, serotonin selective reuptake inhibitor; TCA, tricyclic antidepressant.

TABLE 3. COMPARISON OF DEMOGRAPHIC AND CLINICAL CHARACTERISTICS AMONG YOUTHS WITH 2-4 AND 5-12 MONTHS OF MULTIPLE PSYCHOTROPIC USE

Demographic and clinical characteristics	State A		State B	
	Months of multiple use [^]		Months of multiple use [^]	
	2-4	5-12	2-4	5-12
	n (% prevalence)	n (% prevalence)	n (% prevalence)	n (% prevalence)
Total	386 (0.9)	508 (1.2)	1707 (0.7)	2709 (1.2)
Gender				
Male	273 (1.3)	366 (1.8)	1194 (1.0)	1954 (1.7)
Female	113 (0.6)	142 (0.7)	513 (0.4)	755 (0.6)
Race				
White	214 (1.5)	338 (2.3)	867 (1.3)	1532 (2.2)
African-American	127 (0.6)	127 (0.6)	771 (0.5)	1079 (0.8)
Hispanic	32 (0.9)	27 (0.7)	26 (0.2)	17 (0.1)
Other	5 (0.7)	4 (0.6)	10 (0.3)	24 (0.6)
Age				
<5 years	9 (0.1)	4 (0.3)	61 (0.1)	42 (0.1)
5-9 years	111 (0.9)	130 (1.1)	543 (0.8)	737 (1.0)
10-14 years	164 (1.8)	236 (2.6)	700 (1.3)	1252 (2.3)
15-19 years	102 (1.5)	138 (2.0)	403 (1.1)	678 (1.9)
Aid category				
Disabled	156 (3.6)	286 (6.6)	530 (3.2)	1184 (7.0)
Foster care	53 (4.2)	59 (4.6)	313 (2.2)	748 (5.3)
Low income	174 (0.5)	157 (0.5)	575 (0.5)	517 (0.4)
SCHIP*	3 (0.6)	6 (1.2)	289 (0.3)	260 (0.3)
Psychiatric Disorders				
ADHD	175 (0.4)	273 (0.7)	740 (0.3)	1237 (0.5)
Externalizing	80 (0.2)	126 (0.3)	366 (0.2)	672 (0.3)
Internalizing	79 (0.2)	109 (0.3)	633 (0.3)	1123 (0.5)
Severe Mental Illness	30 (0.1)	48 (0.1)	284 (0.1)	748 (0.3)
Developmental Disabilities	85 (0.2)	159 (0.4)	733 (0.3)	1365 (0.6)
Mental Health Services				
Psychotropic management	137 (0.3)	202 (0.5)	972 (0.4)	1650 (0.7)
Psychotherapy	126 (0.3)	180 (0.4)	947 (0.4)	1383 (0.6)

[^]Months of multiple use represent the number of months during the year in which 2 or more psychotropic classes were dispensed in the same month and % is the percent enrolled; *SCHIP, State Children's Health Insurance Program.

ration of multiple psychotropic use, but, overall, such visits were relatively limited, even among those with 5-12 months of multiple-class use.

Multiple psychotropic class combinations

The majority of combined psychotropic treatments for this cohort involved a stimulant

medication (Table 4). Antidepressant and antipsychotic medications were prescribed with stimulants for 40%-46% and 28%-41% of the cohort, respectively, and 19%-33% received antidepressants with an antipsychotic. Of the 414 youths in State A who received a stimulant with an antidepressant, 33% (n = 137) also received an antipsychotic; and of the 363 youths

TABLE 4. COMMON PSYCHOTROPIC CLASS COMBINATIONS AMONG YOUTH WITH 2–12 MONTHS OF MULTIPLE USE

	State A		State B			
	<i>n</i> = 894		<i>n</i> = 4416 (excluding alpha-agonists)		<i>n</i> = 5217 (including alpha-agonists)	
<i>Multiple psychotropic class use</i>	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Stimulant with</i>						
Alpha-agonist [^]	—	—	—	—	1403	26.9
Antidepressant	414	46.3	1782	40.4	1837	35.2
Antipsychotic	363	40.6	1215	27.5	1240	23.8
Anticonvulsant	173	19.4	1099	24.9	1114	21.4
Antidepressant/Antipsychotic	137	15.3	527	11.9	529	10.1
Anticonvulsant/Antipsychotic	60	6.7	539	12.2	541	10.4
<i>Antidepressant with</i>						
Alpha-agonist	—	—	—	—	650	12.5
Antipsychotic	173	19.4	1433	32.5	1442	27.6
Anticonvulsant	94	10.5	1193	27.0	1197	22.9

[^]In the State B analysis excluding alpha-agonist in the multiple psychotropic definition; 729 (16.5%) with combined pharmacotherapy with stimulants and 535 (12.1%) with combined pharmacotherapy with antidepressants also received an alpha-agonist.

with stimulant and antipsychotic use, 17% (*n* = 60) also received an anticonvulsant. By comparison, of the 1782 youths in State B who received a stimulant and an antidepressant, 30% (*n* = 527) also had an antipsychotic, and 44% the 1215 youths with stimulant and antipsychotic use also received an anticonvulsant.

Alpha-agonist combinations

A subgroup analysis of State B data revealed that 933 youths, initially classified as receiving only one psychotropic medication, were reclassified as receiving two psychotropic classes (*n* = 356) and three or more psychotropic classes (*n* = 577) when alpha-agonists were included in the analysis. Thus, 5% of the 18,841 youths with any psychotropic use received combined pharmacotherapy with an alpha-agonist. In terms of months of use, an additional 920 youths received multiclass psychotropic medications for 1 (*n* = 119), 2–4 (*n* = 258), and 5–12 (*n* = 543) months. The common class combinations are presented in Table 4. A larger proportion of youths received stimulants with an alpha-agonist (26.9%), compared to antidepressants with alpha-agonist (12.5%) treatment. Propor-

tions of stimulant and antidepressants in combination with other psychotropic classes decreased slightly when alpha-agonists were included in the analysis, indicating that the increase of 801 youths with 2–12 months of multiple use was primarily the result of the addition of alpha-agonist with either a stimulant or an antidepressant.

DISCUSSION

Many findings regarding multiple psychotropic use presented here are consistent with earlier studies. Medicaid-enrolled children receiving multiple psychotropic medications are more likely to be male, white, 10–14 years of age, disabled, and in foster care (Martin et al. 2003; Safer et al. 2003). Stimulants and antidepressants are the more common classes prescribed in combination (Bhatara et al. 2002; Efron et al. 2003; Martin et al. 2003; Olsson et al. 2002; Rushton and Whitmire 2001). Also, approximately one third of children with any psychotropic use in the 12-month study period received medication from more than one class, which is consistent with other

findings (Bhatara et al. 2002; Safer et al. 2003). Prior estimates of multiple psychotropic medications range from 49% among youths with ADHD receiving care in psychiatric specialty practices (Zarin et al. 1998) to 60% among youths entering residential treatment facilities (Connor et al. 1997). Rates reported in the U.S. are considerably higher than those reported in the Netherlands (Schirm et al. 2001) but are consistent with survey data from Australian pediatricians and child psychiatrists (Efron et al. 2003). Combined pharmacotherapy with alpha-agonists has been noted by others (Bhatara et al. 2002; Efron et al. 2003; Martin et al. 2003; Zima et al. 1999; Zito et al. 1999), and our study suggests such combinations were one-quarter of multiclass usage.

Very little information from large datasets has been written on the duration of psychotropic treatment or of combined pharmacotherapy among children. Among a cohort of children 9–18 years of age, continuously enrolled in the Ohio Medicaid program, and initiating antidepressant treatment between August and October 1997, children received antidepressants, on average, for 5.5 months during the 12-month period (Shireman et al. 2002). Others have found that 47% and 26% of youths 5–18 years of age continued SSRI treatment at 3 and 6 months, respectively (Richardson et al. 2004). Martin et al. (2003) defined concomitant psychotropic treatment based on a 7-day overlap of medication, but they did not examine the duration of multiple use over the year. Similarly, Rushton and Whitmire (2001) defined the combined use of stimulant and antidepressant treatment based on same-month use, but the authors did not report on the duration of treatment.

Our analysis offers new information regarding multiple psychotropic treatments among children. The prevalence of multiple psychotropic use was 2.4%–2.9% overall, of which nearly half was for 5–12 months. Differences in the definition of multiple psychotropic treatment limit comparisons to other studies. For example, Martin et al. found that only 13.6% of psychotropic users had multiple medications as defined by a 7-day overlap (Martin et al. 2003; Rushton and Whitmire 2001). However,

the 0.5%–0.7% prevalence for 1 month of multiple use is remarkably similar to earlier reports. The more prevalent use for 5–12 months among males, whites, those 10–14 years of age, the disabled, and those with a severe mental illness suggests that the characteristics associated with multiple psychotropic use also are prominent for extended multiple psychotropic treatment. Unfortunately, these data do not permit an assessment of behavioral, academic, or social functioning, and so one cannot relate these findings to improved outcomes. Nonetheless, by identifying a subgroup of children with extended periods of multiple psychotropic use, future investigations of the effectiveness and outcomes of combined pharmacotherapy can target this population.

Furthermore, new information on the continuity of multiple psychotropic treatments was presented. Nearly one half of multiple psychotropic use was for 5–12 months. A considerable proportion of multiple use involves antidepressant medications, and approximately 60% of antidepressant use was an SSRI. Bhatara et al. (2002) noted a five-fold increase in combined stimulant pharmacotherapy, most of which involved antidepressants and clonidine. In a national survey of physician office visits for ADHD among 5–14-year-olds, 9.6% of visits involved a stimulant with another psychotropic medication (Zito et al. 1999), most commonly antidepressants. These findings, together with the recent U.S. Food and Drug Administration (FDA) cautions about the use of SSRI medications in youth, carry important implications for the monitoring of adverse effects.

The most common disorders among those with multiclass use for 2–12 months were ADHD followed by an externalizing or internalizing disorder. As many as one third of children with ADHD also have a coexisting anxiety or mood disorder (Barkley 1998; Jensen et al. 2001), and one half of children have a cooccurring conduct or oppositional defiant disorder (Barkley 1998). Similarly, comorbid depression and disruptive disorders were more common among visits with multiple psychotropic use than those who received only stimulant treatment (Zito et al. 1999). Even though the use of multiple psychotropic medications

was similar between states, the state differences in clinician-reported psychiatric diagnostic profiles warrant further study to distinguish local practice differences from patient population differences.

Several limitations prevent more conclusive statements about the findings reported in this paper. Firstly, a 12-month cross-sectional analysis only partially addresses the larger issue of the continuity of care in community settings. Secondly, this study included two states that were located in the mid-Atlantic region of the U.S., and so it may not be representative of community patterns in other regions of the country. However, comparisons within a region highlight the importance of small area variations. Thirdly, Medicaid claims represent billable medical services related to a specific encounter, and so the data may not capture other chronic conditions or treatments that were not related to the reason for the visit. However, since the current study focused on 12-month psychotropic utilization among continuously enrolled youths, this should not have compromised the study findings. Fourthly, while variation in state policies may have affected utilization, the consistent findings across state Medicaid and SCHIP programs lend credibility to the estimates reported in this paper. Finally, the continuously enrolled cohort is likely to represent a more impaired subgroup of the population. Given that the vast majority of children were continuously enrolled in Medicaid, this should not compromise the findings.

CONCLUSIONS

In summary, this study provides new information about community practice patterns related to multiple psychotropic treatments for children. Future research is needed to better understand patterns of transitioning between single- and multipolytropic treatments. Such knowledge would address the extent to which combined pharmacotherapy is tolerable and effective in treating symptoms and improving behavioral, social, and academic outcomes.

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