Psychotropic Medication Characteristics for Special Education Students with Emotional and/or Behavioral Disorders

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Abstract

Objective: Characteristics of psychotropic medication use have rarely been investigated for special education students with emotional and/or behavioral disorders.

Methods: The prevalence of psychotropic medication use was obtained at the beginning of a school year for a cohort of 77 students attending a self-contained middle school for special education students with emotional and/or behavioral problems, in the suburban New York City area. Demographics, intelligence quotient (IQ) and achievement testing, and objective measures of both psychopathology and school functioning were gathered.

Results: Overall, psychotropic medication was used in 77.9% of the participants; 52.0% received more than one medication. The most commonly prescribed medicines were atypical antipsychotics (49.4%) followed by attention-deficit/hyperactivity disorder (ADHD) medications (48.0%). Usage patterns for specific diagnostic presentations were examined, and appeared consistent with current clinical practice. Persistent elevated psychopathology appeared frequently in students on medication.

Conclusions: Psychotropic medication use in this unique but important sample of special education students appeared generally consistent with recent psychotropic prevalence research. The need for collaboration between special education teachers and prescribing physicians, in order to achieve optimal medication adjustment for these students, was highlighted.

Introduction

PSYCHOTROPIC MEDICATION CHARACTERISTICS have rarely been investigated in special education students with emotional and/or behavioral disorders. The most recent study (Mattison 1999) investigated psychotropic usage from 1993 to 1996 in 89 elementary school students classified as having serious emotional disturbance who were in either self-contained classes (52%) or a self-contained school (48%). At baseline, 38.2% of the participants were receiving a psychotropic medication, with 16.8% taking more than one medication. A similar study has not been repeated for special education students in a public school, such as a resource room, a self-contained class, or a self-contained school.

The only related interim information about psychotropic usage in such students has been provided for 137 students in a non-public school residential setting who were classified by the federal special education category as having emotional disturbance (Ryan et al. 2008). The large majority of the students (75.9%) were taking a psychotropic medicine, including 56.2% who were taking two or more medicines. These findings were double the findings in the earlier study of such students (Mattison 1999). One likely reason was that these special education students were in residential programs for seriously dysfunctional youth rather than in public school

programs for those with less dysfunction at school and/or home. However, another probable reason is that the increased rates in the Ryan study are also consistent with recent national trends of significantly increased prescribing of psychotropic medications for youth by all physicians, not only singly, but also concomitantly. For the period from 1987 to 1996, the overall rate of psychotropic prescribing more than doubled (Olfson et al. 2002; Zito et al. 2003). Then, from 1996 to 2007, the overall rate rose by ~75% (Comer et al. 2010).

A new study of current psychotropic usage in special education students with emotional and behavioral disorders is especially timely for both special education teachers and prescribing physicians. Special educators have become increasingly informed of the accumulating evidence base for the use of psychotropics to treat specific psychiatric disorders in their students (Forness and Kavale 2001), which can complement their frontline behavioral and academic interventions (Forness et al. 1999). However, they continue to have minimal working knowledge about psychotropic medications (Ryan et al. 2012) despite improving resources (Konopasek 2012). They now need more real-time awareness of which psychotropics (alone and in combination) are currently being prescribed for their students, to better recognize those medications with which they must be especially familiar.

Special educators better trained in psychotropic knowledge would become improved reporters to help prescribing physicians determine the beneficial and side effects of the psychotropic medications they are increasingly prescribing to youth. However, at this point, prescribing physicians do not appear to commonly obtain feedback about medication effects from teachers, except those for attention-deficit/hyperactivity disorder (ADHD) and disruptive behavior disorders (Mattison et al. 2007). To stimulate collaboration, a new study of psychotropic usage would aid physicians in better appreciating which psychotropics they are currently prescribing to special education students with emotional and behavioral problems, whether their prescribing practices make clinical sense, and how effective these medicines might be in reducing psychopathology in school.

Therefore, this study was undertaken to update our knowledge of which psychotropic medications are being prescribed for special education students with emotional and/or behavioral disorders. We anticipated that both psychotropic use and polypharmacy have increased since the last similar study in 1999, consistent with overall national trends. We also aimed to examine the relationships between the diagnostic presentations of the students and their medication regimens, to help assess their consistency with current clinical practice. We sought to ascertain any distinguishing student characteristics for polypharmacy, such as increased severity of psychopathology and/or dysfunction in school. Finally, by obtaining teacher ratings of psychopathology, we hoped to gain some insight into the clinical status of these difficult students.

Methods

Participants

Psychotropic medication usage was determined for a cohort of 77 special education students who began the 2008–2009 school year in a self-contained middle school (SCS) (grades 6–8) in the suburban New York City area. The large majority (62; 80.5%) also completed the year. This program was for special education students with emotional and/or behavioral disorders who had not responded sufficiently to special education services within their general education schools.

The SCS program has been described extensively elsewhere (Mattison and Schneider 2009). To summarize, students were taught in preparation for state assessment in classrooms of eight or fewer pupils by a special education teacher and a paraprofessional, using both direct individual instruction and small group instruction. Behaviorally, a level system was used to systematically provide schoolwide positive reinforcement. The school-based therapeutic components included individual counselors, psychiatric consultation, and an imbedded day program for those students who required the most intensive intervention to prevent hospitalization.

Their mean age was 12.9 ± 1.0 years (mean grade = 7.3 ± 0.8). The great majority were boys (87.0%), and the ethnic distribution was 64.9% Caucasian, 29.9% African American, and 5.2% other. Socioeconomically, 44.2% received free or reduced-cost lunch.

Educationally, the mean intelligence quotient (IQ) scores at enrollment for the participants were as follows: Verbal IQ ($n = 76$) 98.8 ± 14.8 , performance IQ ($n = 76$) 97.0 ± 15.7 , and full scale IQ 96.1 ± 15.0 . Their mean standard scores ($n = 68$) for the Woodcock-Johnson III Tests of Achievement (Woodcock et al. 2001) during the school year were 93.4 ± 17.3 for broad reading and 89.3 ± 14.1 for broad math. The respective mean grade equivalencies were 6.6 ± 3.2 and 5.7 ± 2.0 , compared with a mean chronological grade level of 7.4 ± 0.8 at the time of testing.

Although all the students were referred to the SCS for serious emotional and/or behavioral problems, the distribution of their federal special education categories varied at their enrollment into the SCS: Emotional disturbance (50.6%), other health impaired (24.7%), multiple disabilities (13.0%), learning disability (6.5%), and autism (5.2%).

Materials and procedure

The information detailed here was obtained from student files at the beginning and end of the school year. These data are typically gathered by this SCS program. The study was approved by the special education agency that provides the SCS and by the institutional review board (IRB) of the affiliated institution.

Recording of psychotropic medications. During the first marking period, the psychotropic medication(s) that students were taking at that time were recorded. The program's nurses and consulting psychiatrists routinely obtain such information from parents at the start of the school year for medical/psychiatric questions that might subsequently arise.

The principal psychotropic categories used in this report were anxiolytics, atypical antipsychotics (no earlier first generation antipsychotics were found), mood stabilizers (anticonvulsants [non-seizure use] and lithium), selective serotonin reuptake inhibitors (SSRIs) (no earlier generation antidepressants were found), and other medications. In addition, stimulants, atomoxetine, and α -agonists were also combined into an ADHD medication category.

Measures of psychopathology. Two methods were independently used to describe psychopathology. First, at the end of the first marking period teachers completed the Child and Adolescent Symptom Inventory Progress Monitor (CASI-PM-T) (Sprafkin et al. 2010), a 30 item behavioral checklist with American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. (DSM-IV)-based symptom categories (developed from the original CASI-T [Gadow and Sprafkin 1998]) (American Psychiatric Association 1994). Psychometric properties have been established in different samples of students, including special education students with emotional and/or behavioral disorders (Sprafkin et al. 2011). T scores have been determined based on samples of general education students (Sprafkin et al. 2011).

Second, DSM-IV diagnoses were determined at enrollment by the psychiatric consultant, using a diagnostic procedure that has been previously described (Mattison et al. 2003). To further augment this process, observations were also used from treatment team discussions that occurred during each student's first marking period after enrollment in the program. Diagnoses were determined independently from the CASI-PM-T. Acknowledging the diagnostic controversy of juvenile bipolar disorder, criteria for the narrow clinical phenotype of mania were used, which emphasizes the need for either elevated/expansive mood and/or grandiosity (Leibenluft et al. 2003).

Measures of school functioning during the school year. Basic annual measures of school function were collected at the end of the school year (Mattison 2004b). They consisted of final grade point average (GPA) in major subjects (0–100 with, e.g., 70–79 = “C”), total days absent, total written office disciplinary referrals without subsequent suspension (DR), and total out-of-school suspensions (OSS).

TABLE 1. DISTRIBUTION OF PSYCHOTROPIC MEDICATION USE (%) FOR 77 STUDENTS IN A SELF-CONTAINED MIDDLE SCHOOL

No medication	22.1
Any medication	77.9
1	26.0
2	23.4
> 2	28.6
Medication groups:	
Atypical antipsychotics	49.4
Stimulants	33.8
Mood stabilizers	28.6
Lithium	7.8
Anticonvulsants	26.0
Selective serotonin reuptake inhibitors	28.6
Anxiolytics	2.6
Other medications	
Atomoxetine	10.4
Alpha agonists	6.5
Bupropion	2.6
Most common (>20%) combinations:	
Atypical + stimulant	22.1
Atypical + Mood stabilizer	20.8

Data analysis

Significance ($p < 0.05$) between groups was determined with either t test/ANOVA for quantitative data or χ^2 analysis for categorical data.

Results

Distribution of psychotropic medication usage

Overall, psychotropic medication was used in 77.9% of the participants (Table 1). The mean number of medicines per student was 1.7 ± 1.4 . Over half (52.0%) received more than one medication.

The distribution of medications used by at least 25% of the students was, in descending order: Atypical antipsychotics (49.4%), stimulants (33.8%), and 28.6% for both mood stabilizers and SSRIs (Table 1). If atomoxetine and α agonists are considered medications for ADHD along with stimulants, then 48.0% of the students were taking at least one ADHD medicine. When combinations of medi-

cations were examined, almost 25% of the participants were on an atypical antipsychotic plus a stimulant or on an atypical antipsychotic plus a mood stabilizer.

Psychotropic medication use according to DSM-IV clinical presentations

The overall percentages of DSM-IV disorders were, in descending order: 57.1% ADHD, 50.6% oppositional defiant disorder (ODD)/conduct disorder (CD), 28.6% depressive disorder, 20.8% pervasive developmental disorder (PDD), 13.0% anxiety disorder, 7.8% psychotic disorder, and 3.9% other. Comorbidity occurred in 67.5% of the students. The most common combinations of disorders (>15%) were 33.8% ADHD with ODD/CD, 16.9% ADHD with depressive disorder, and 16.9% ODD/CD with depressive disorder.

The level of diagnostic comorbidity in this cohort of participants did not allow simple comparison of medication use within single DSM-IV diagnostic categories. Therefore, we decided to examine which medications were used in the most common actual clinical presentations of these students. Table 2 presents the most common presentations of DSM-IV disorders found in the participants (four groups of 9–19 students [12–25%]), followed by the distribution of medication use for each of the presentations.

Two diagnostic groups were characterized by single disorders: PDD only and ADHD only. Atypical antipsychotics predominated in the PDD only group (60.0%) and ADHD medicines in the predominated in the ADHD only group (77.8%).

In the third group, consisting of two disorders (ADHD + ODD/CD), two medicines predominated: ADHD medicines (63.2%) followed by atypical antipsychotics (52.6%). The fourth group was diagnostically the most complex, with depression plus one or two additional diagnoses. Three medicines were used in at least 30% of these students, including SSRIs, which were the most frequently prescribed in this group (37.5%), among all four diagnostic groups.

More than one medication was most commonly used in half of the ADHD + ODD/CD group and in half of the PDD only group. On the other hand, 22.2–31.6% of the groups were on no psychotropic medication.

Severity of psychopathology and school functioning

General characteristics for the total group. Psychopathology was rated by the teachers for all participants with the CASI-PM-T. The severity of the six symptom categories was, in descending

TABLE 2. DISTRIBUTION OF MEDICATION CATEGORIES (%) WITHIN THE MOST COMMON DSM-IV PRESENTATIONS IN THE PARTICIPANTS

Medication categories	Total participants (n = 77)	Most common groups of DSM-IV disorders			
		PDD only (n = 10)	ADHD only (n = 9)	ADHD + ODD/CD (n = 19)	Depression + ADHD &/or ODD/CD (n = 16)
Atypical antipsychotics	49.4	60.0	22.2	52.6	43.8
ADHD Rx ^a	48.0	30.0	77.8	63.2	31.2
Mood stabilizers	28.6	20.0	11.1	15.8	18.8
SSRIs	28.6	20.0	0	0	37.5
No medication	22.1	30.0	22.2	31.6	31.2
> 1 medication	77.9	50.0	33.3	52.6	37.5

Comparisons were not conducted for significant differences among the groups.

^aADHD Rx (n = 37) = stimulant, atomoxetine, and/or α agonist.

DSM-IV, American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. PDD, pervasive developmental disorder; ADHD, attention-deficit/hyperactivity disorder; ODD, oppositional defiant disorder; CD, conduct disorder; SSRIs, selective serotonin reuptake inhibitors.

TABLE 3. SEVERITY OF PSYCHOPATHOLOGY AND SCHOOL FUNCTIONING ACCORDING TO NUMBER OF MEDICATIONS USED

Variable	Total group n=77	Number of medications used			
		0 n=17 (1)	1 n=20 (2)	≥ 2 n=40 (3)	
CASI-PM-T categories (T scores):					
ADHD (Inattentive)	61.7±10.2	54.4±9.4	64.8±9.3	63.3±9.7	2,3>1*
ADHD (Hyperactive/Impulsive)	67.2±16.4	61.5±12.2	70.7±20.5	67.9±15.3	
ODD	69.9±17.9	64.0±15.8	72.8±19.4	71.0±17.8	
CD	57.9±14.3	54.2±10.8	63.0±19.7	57.0±11.8	
Social anxiety	61.4±16.2	58.9±18.3	65.2±17.2	60.7±14.9	
Global depression	67.8±17.0	63.3±19.2	73.2±17.8	67.0±15.3	
Total score (raw score)	29.3±13.4	22.5±12.2	34.6±14.3	29.4±12.5	2>1**
Annual measures of school function (n=62)					
GPA (major subjects)	78.9±8.7	81.4±8.7	77.8±8.5	78.2±8.9	
DRs	4.8±6.0	3.5±3.9	3.5±4.2	6.0±7.4	
OSS	0.6±1.2	0.4±1.1	0.4±0.7	0.8±1.4	
Days absent	21.0±23.8	17.7±26.4	29.7±29.4	18.0±18.4	
Treatment:					
Hospitalization	31.1%	5.9%	33.3%	41.0%	3>1**
Day program	31.2%	0	30.0%	45.0%	2,3>1*

Mean score ± SD. Although statistical comparisons among the four groups are limited by the numbers within the groups as well as by the numbers of variables examined, we have chosen to list the resultant *p* values.

p* < 0.005; *p* < 0.05.

CASI-PM-T, Child and Adolescent Symptom Inventory Progress Monitor; ADHD, attention-deficit/hyperactivity disorder; ODD, oppositional defiant disorder; CD, conduct disorder; GPA, grade-point average; DR, disciplinary referrals; OSS, out-of-school suspension.

order (Table 3): ODD, global depression, and ADHD (hyperactive-impulsive), followed by ADHD (inattentive), social anxiety, and CD. Whereas no mean T score for the total group was ≥ 70 (98th percentile or 2 standard deviations [SD] above the mean), the mean T scores for the first three symptom categories were ≥ 65 (93rd percentile or 1.5 SD). Furthermore, three categories of the single medication group and one category of the multiple medication group had mean T scores > 70.

Reflecting the above findings of common serious psychopathology, 24.3% of the students were hospitalized once, 5.4% twice, and 1.4% three times during the course of the school year (any psychiatric hospitalization = 31.1% [Table 3]). Almost one third of all participants were in a day program, whereas 16.9% experienced both hospitalization and day programs. Furthermore, on average, all students (the total group) had one office DR per marking period, were infrequently suspended, and missed > 4 weeks of school during the year.

Characteristics according to number of medications used. The students were divided into three medication groups (Table 3): No medication (Group 1; *n* = 17), one medication (Group 2; *n* = 20), and two or more medications (Group 3; *n* = 40). Although statistical comparisons among the three groups are limited by the numbers within the groups as well as the numbers of variables examined, we have chosen to list the resultant *p* values.

To begin with, the three groups were compared on demographic measures, all IQ and achievement scores, and psychiatric diagnoses. The only significant difference was for race (Caucasian): Group 1 (58.8%), Group 2 (45.0%), and Group 3 (77.5%) (*p* = 0.04, 3 > 2).

The single medication group showed the highest mean T scores for the six symptom categories (Table 3), followed by the ≥ 2 medication group and then the no medication group. However, only one significant difference (ADHD [hyperactive-impulsive]) was found among

the groups for the categories, as well as for the total score, mainly differentiating the two medication groups from the no medication groups but not distinguishing between the medication groups.

Functionally (Table 3), the no medication group showed the best overall school functioning on the four measures, but no significant differences were found. For intensive community treatment, the students in the two medication groups were found to have experienced significantly more psychiatric hospitalizations and/or day program participation than the no medication group.

Discussion

Psychotropic medication was used in the large majority of the special education participants of this study (77.9%), frequently in combination (52.0%). Atypical antipsychotics were the most commonly used medicine (in almost half of the students, 49.4%), followed closely by ADHD medications in 48.0%, including stimulants in one third (33.8%). Specific use of medications in the actual diagnostic presentations of the students appeared mainly to show ADHD medications when ADHD was present, and atypical antipsychotics when PDD or ODD/CD were present. Few significant differences were found when comparing groups with different numbers of medicines, except that medicated students were significantly more likely to have experienced psychiatric hospitalization and/or day programming during the course of the study's school year. Finally, serious psychopathology still occurred in many students who were on psychotropic medication.

Comparison of our medication findings with previous studies is limited because psychotropic medication usage has rarely been investigated in special education students with emotional and/or behavioral disorders. However, Table 4 presents three studies that allow some key comparisons with the current study: The last study of psychotropic usage in such students in a public school setting

TABLE 4. COMPARISON OF MEDICATION USE (%) IN DIFFERENT TREATMENT SETTINGS

Medication	Treatment settings			
	Current SCS (n = 77)	SCC+ SCS 1999 ^a (n = 89)	Residential ED students 2008 ^b (n = 137)	NY outpatient clinics 2005 ^c (n = 1292)
Any medication	77.9	38.2	75.9	74
> 1 medication	52.0	16.8	56.2	37
Medication groups:				
Antipsychotics	49.4	11.2	41.6	27
Stimulants	33.8	25.8	13.1	35
Mood stabilizers	28.6	4.5	28.5	8
Antidepressants	28.6	6.7	48.9	33

The first three columns include students who are classified by a federal special education category, whereas the last column includes New York state outpatient/private attendees with unknown classification status. The antidepressant group includes both selective serotonin reuptake inhibitors (SSRIs) as well as the earlier generation of antidepressants such as tricyclics.

^aMattison 1999.

^bRyan et al. 2008.

^cStaller et al. 2005.

SCS, self-contained school; SCC, self-contained class; ED, emotional disturbance.

(Mattison 1999), the most recent study of such students, although in a residential setting (Ryan et al. 2008), and a recent study of usage in outpatient youth in the same state of New York (Staller et al. 2005). The most direct comparison is with an earlier sample of students in elementary school who were classified as having serious emotional disturbance, half of whom were in an SCS (Mattison 1999). The current finding for overall medication use of 77.9% is double what was found in this earlier study (38.2%), and, therefore, consistent with the national trend for increased usage (~75%) over a similar time period (Comer et al. 2010). Stimulants and antipsychotics were the most commonly used medications in both studies, though in reverse order. In addition, whereas the use of stimulants increased by almost one third, the use of antipsychotics more than quadrupled (as did the use of mood stabilizers and antidepressants). Furthermore, aside from stimulants, few of the medications used in the past study appeared in the current study, and vice versa.

The medication usage in this report is consistent with the percentages of overall and combined use found for students classified as having emotional disturbance in three residential settings for students (Table 4; Ryan et al. 2008), that is, therapeutic settings more intensive than the SCS of this study. Although the percentages of antipsychotics and mood stabilizers were quite similar between the two studies, the current findings show double the use of stimulants and close to half the use of antidepressants compared with the residential study. This difference might partly be explained by the fact that one residential setting was for youth with histories of drug abuse (where stimulant usage was likely limited).

The present results were also compared with those of a study of psychotropic medication use in outpatient settings in the state of New York during 2002 (Table 4; Staller et al. 2005), that is, less intensive settings than an SCS but in the same state as the current study. The outpatient distribution showed similar overall usage, but less polypharmacy, and also much less use of antipsychotics and mood stabilizers. These differences could well be related to the

increased severity of psychopathology (especially externalizing) that has been shown for students classified with emotional and/or behavioral disorders compared with outpatient youth (Mattison 2004a). Teachers rated the current SCS participants in the upper 5th percentile on the ODD and ADHD (hyperactive/impulsive) symptom categories, whereas the most common DSM-IV diagnoses were ADHD (57.1%) and ODD/CD (50.6%).

The distribution of specific medications according to the most common clinical presentations presented by the participants provided some real-time insight into how the medications were being prescribed according to their actual diagnoses, and whether this was consistent with clinical practice. This approach was chosen rather than inspection by single diagnosis, which has usually been the case in such psychotropic prevalence studies, because single diagnoses or even generally termed comorbidities produce limited or potentially misleading results for understanding what psychotropic medications are actually prescribed in complex clinical presentations. For the PDD only group, atypical antipsychotics were most commonly prescribed, and, indeed, have an indicated use in PDD (AACAP, in press). Within the ADHD only group, ADHD medicines predominated, whereas atypical antipsychotics appeared to often be added to ADHD medicines when ADHD occurred in combination with ODD or CD. In clinical practice, antipsychotics or mood stabilizers are commonly added to ADHD medications when ODD/CD symptoms are also present and unresponsive to initial ADHD medicines, although the evidence base for such polypharmacy is limited (Blader et al. 2010). Therefore, overall the preceding real-world groupings appear to indicate prescribing practices that are consistent with community standards.

The most dramatic difference between the 1999 and current studies is the increased use of antipsychotics and polypharmacy. However, the findings are not definitive, because of different possible explanations; for example, similar groups of special education students with emotional and/or behavioral problems were not followed over time. Nevertheless, the change for antipsychotics appears consistent with national trends for antipsychotics in youth (Olfson et al. 2012; Zito et al. 2013). This antipsychotic research also appears to reflect other findings of the current study. For example, Olfson and colleagues found that antipsychotics were most commonly prescribed by psychiatrists in the 2005–2009 time period for youth with the *International Statistical Classification of Diseases and Related Health Problems*, 9th revision (ICD-9) diagnosis of disruptive behavior disorder (53.0%), as well as 51.2% when comorbid disorders were present. When Zito and colleagues compared antipsychotic usage between 1997 and 2006, the increased antipsychotic prescribing in 2006 was significantly distinguished by increased percentages of bipolar disorder and ADHD/disruptive behavior disorder.

Similarly, the change in polypharmacy also appears consistent with national trends. For example, polypharmacy with two or more psychotropic medications prescribed by physicians for youth with psychiatric disorders has increased by ~50% between 1996 and 2007 (Comer et al. 2010). Such polypharmacy visits were most often associated with disruptive behavior disorder (53.7%) and two or more disorders (47.4%).

Few significant differences were discovered between groups with no medication, monopharmacy, and polypharmacy beyond what appeared to be severity of dysfunction as represented by experience in a more intensive mental setting such as a day program or inpatient setting during the school year. (Although the statistical findings for these intergroup comparisons are limited by the numbers within each group and by the numbers of variables used for comparison, we chose

to include the results because such studies of psychotropic usage in emotionally and behaviorally disturbed [EBD] students are so rare.) These findings appear consistent with past work. Characteristics for polypharmacy were previously investigated among 392 youth 2–17 years of age treated by private psychiatrists in 1997 and 1999 (Duffy et al. 2005). The predictors (from demographic and clinical factors) of polypharmacy over monopharmacy were the increased presence of bipolar disorder, comorbidity, and inpatient setting. Griffith et al. (2010) compared monopharmacy versus polypharmacy in 180 youth (10–18 years old) on psychotropic medication as they entered residential treatment (i.e., the equivalent of an inpatient setting) in 2004–2005. No significant differences between the monopharmacy and polypharmacy groups were found for demographics, behavioral checklist scores, or psychiatric disorders.

Finally, the clinical effectiveness of the psychotropics prescribed for the participants in this study could be questioned for many students. That is, especially for teachers' ratings of the ODD, global depression, and ADHD (hyperactive/impulsive) symptom categories of the CASI-PM-T, elevated mean T scores (of at least 1.5 SD) persisted, especially for those students on at least one medication. "Why" could be answered by several explanations, which will not be expanded upon here. More importantly for this report is the question of whether or not the prescribing physicians were aware of this continuing serious psychopathology, which could aid their readjustments of both medication and non-medication treatments. This finding highlights the need for physicians to get feedback from teachers when they are prescribing psychotropics for youth with school psychopathology, even more so for special education students. In the authors' experience with special education students such as those in this study, this information is not commonly requested by community prescribers.

Limitations

The participants in this study were from one self-contained middle school for special education students with emotional and/or behavioral disorders, which must be replicated with a broader sample. Medication distributions must also be ascertained for other age groups of such students, as well as for students in less restrictive settings such as inclusion or self-contained classes, for comparative analyses. Finally, investigation of the same type of students over time would more definitively answer the question of whether or not there were true changes in their psychotropic usage.

A unique feature of this study was examining medication use for actual clinical presentations. A greater number of participants would have permitted better comparisons and also the possibility of other diagnostic groupings to study. One hopes that future studies will attempt such real-world groupings, to further improve our understanding of how psychotropics are truly being prescribed for such youth.

In this study, it appeared that many students were still experiencing high levels of symptoms in school despite their medications. Future studies should compare stable and unstable students for possible explanatory reasons, such as classroom environmental factors, inadequate dosage, insufficient treatment in the community, and/or unaddressed family factors. Indeed, the increased use of atypical antipsychotics and of multiple psychotropic combinations (especially those combinations without an evidence base) found in this study, although undoubtedly prescribed for therapeutic benefit, might also be involved in the poor clinical status of many students. Therefore, their actual clinical contribution would be important to ascertain, especially in balance with side effects of

particular concern, such as the metabolic consequences of the atypical antipsychotics.

Also important for both teacher and clinician knowledge, side effects noted by teachers should be assayed. In particular, disruption to cognitive processes would be especially pertinent to know about for school. For example, anticonvulsant mood stabilizers may disrupt cognition negatively, and atypical antipsychotics can cause interfering sedation, which are important to take into consideration for those many special education students who have comorbid learning and/or language disabilities that could be further compromised by side effects (Mattison 2004a).

Conclusions

The characteristics of prescription rates for psychotropic medications in this sample of special education students with serious emotional and/or behavioral problems seem to have increased similarly to those in broader national studies over the same time period, as well as appearing generally consistent with current clinical practice. Polypharmacy was common, and may have been primarily related to overall school dysfunction, as exemplified by need for hospitalization and/or day programming. Importantly, serious levels of psychopathology remained in many of these special education students on psychotropics.

Clinical Significance

The large majority of students in this SCS sample were on at least one medication from a notable wide range. This finding emphasizes the need for teachers of EBD students to have an adequate working knowledge of the various DSM-IV disorders for which their students are treated, as well as the positive actions and the potential side effects of medicines that their students are taking (particularly sedation and cognitive disruption).

Prescribing physicians need teachers' informed observations to make timely adjustments, especially in these complex and seriously ill youth. Students may be functioning more poorly at home because of stresses there that are common to EBD students, or functioning more poorly at school because of common accompanying cognitive and/or achievement deficits. A student may be stable at school but not at home, and a medication adjustment to calm anger at home may lead to sedation at school and worsening academic performance. Therefore, clinicians must have a good understanding of student functioning in both environments.

Furthermore, teacher feedback will not only help prescribing clinicians, but can also help child psychiatric researchers trying to assess the impact of medications and other treatments for specific disorders. Unfortunately, teacher observations are not commonly used in medication research outside of ADHD and, to a lesser degree, disruptive behavior disorders (Mattison et al 2007).

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References

- American Academy of Child and Adolescent Psychiatry: Practice parameter for the use of atypical antipsychotic medications in children and adolescents. *J Am Acad Child Adolesc Psychiatry*, in press.

- American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (DSM-IV). Washington, DC: American Psychiatric Association; 1994.
- Blader JC, Pliszka SR, Jensen PS, Schooler NR, Kafantaris V: Stimulant-responsive and stimulant-refractory aggressive behavior among children with ADHD. *Pediatrics* 126:796–806, 2010.
- Comer JS, Olfson M, Mojtabai R: National trends in child and adolescent psychotropic polypharmacy in office-based practice, 1996–2007. *J Am Acad Child Adolesc Psychiatry* 49:1001–1010, 2010.
- Duffy FF, Narrow WE, Rae DS, West JC, Zarin, DA, Rubio-Stipec M, Pincus HA, Reiger DA: Concomitant pharmacotherapy among youths treated in routine psychiatric practice. *J Child Adolesc Psychopharmacol* 15:12–25, 2005.
- Forness SR, Kavale KA: Ignoring the odds: Hazards of not adding the new medical model to special education decisions. *Behav Disord* 26:269–281, 2001.
- Forness SR, Kavale KA, Sweeney DP, Crenshaw TM: The future of research and practice in behavioral disorders: Psychopharmacology and its school implications. *Behav Disord* 24:305–318, 1999.
- Gadow KD, Sprafkin J: Adolescent Symptom Inventory–4 Norms Manual. Stony Brook, NY: Checkmate Plus; 1998.
- Griffith AK, Huscroft-D'Angelo J, Epstein MH, Singh NN, Heffner JC, Pick R: Psychotropic medication use for youth in residential treatment: A comparison between youth with monopharmacy vs polypharmacy. *J Child Fam Stud* 19:795–802, 2010.
- Konopasek DE: Medication Fact Sheets: A Behavioral Medication Reference for Educators, 4th ed. Champaign, IL: Research Press; 2012.
- Leibenluft E, Charney DS, Towbin KE, Bhangoo RK, Pine DS: Defining clinical phenotypes of juvenile mania. *Am J Psychiatry* 160:430–437, 2003.
- Mattison RE: Psychiatric and psychological assessment of emotional and behavioral disorders during school mental health consultation. In: *Handbook of Research in Emotional and Behavioral Disorders*. Edited by R.B. Rutherford, M.M. Quinn, S.R. Mathur. New York: Guilford Press, 163–180, 2004a.
- Mattison RE: Universal measures of school functioning in middle school special education students. *Behav Disord* 29:359–371, 2004b.
- Mattison RE: Use of psychotropic medication in special education students with serious emotional disturbance. *J Child Adolesc Psychopharmacol* 9:149–155, 1999.
- Mattison RE, Carlson GA, Cantwell DP, Asarnow JR: Teacher and parent ratings of children with depressive disorders. *J Emot Behav Disord* 15:184–192, 2007.
- Mattison RE, Gadow KD, Sprafkin J, Nolan EE, Schneider J: A DSM-IV-referenced teacher rating scale for use in clinical management. *J Am Acad Child Adolesc Psychiatry* 42:442–449, 2003.
- Mattison RE, Schneider J: First-year effectiveness on school functioning of a self-contained ED middle school. *Behav Disord* 34:60–71, 2009.
- McClellan J, Stock S, American Academy of Child and Adolescent Psychiatry (AACAP) Committee on Quality Issues (CQI): Practice parameter for the use of atypical antipsychotic medications in children and adolescents with schizophrenia. *J Am Acad Child Adolesc Psychiatry* 52:976–990, 2013.
- Olfson M, Blanco C, Liu SM, Wang S, Correll CU: National trends in the office-based treatment of children, adolescents, and adults with antipsychotics. *Arch Gen Psychiatry* 69:1247–1256, 2012.
- Olfson M, Marcus SC, Weissman MM, Jensen PS: National trends in the use of psychotropic medications by children. *J Am Acad Child Adolesc Psychiatry* 41:514–521, 2002.
- Ryan JB, Reid R, Ellis C: Special educators' knowledge regarding psychotropic interventions for students with emotional and behavioral disorders. *Remedial Spec Educ* 29:269–279, 2012.
- Ryan JB, Reid R, Gallagher K, Ellis C: Prevalence rates of psychotropic medications for students placed in residential facilities. *Behav Disord* 33: 99–107, 2008.
- Sprafkin J, Lavigne JV, Cromley T, Mattison RE, Gadow KD: Manual for the Child & Adolescent Symptom Inventory Progress Monitor. Stony Brook (NY), Checkmate Plus, 2010.
- Sprafkin J, Mattison RE, Gadow KD, Schenider J, Lavigne JV: A brief DSM-IV-referenced teacher rating scale for monitoring behavioral improvement in ADHD and co-occurring symptoms. *J Atten Disord* 15: 235–245, 2011.
- Staller JA, Wade MJ, Baker M: Current prescribing patterns in outpatient child and adolescent psychiatric practice in central New York. *J Child Adolesc Psychopharmacol* 15: 57–61, 2005.
- Woodcock RW, McGrew KS, Mather N: Woodcock Johnson III Tests of Achievement. Itasca, IL: Riverside Publishing; 2001.
- Zito JM, Burcu M, Ibe A, Safer, DJ, Magder LS: Antipsychotic use by Medicaid-insured youth: Impact of eligibility and psychiatric diagnosis across a decade. *Psychiatric Services* 64, 223–229, 2013.
- Zito JM, Safer DJ, dosReis S, Gardner JF, Magder L, Soeken K, Boles M, Lynch F, Riddle MA: Psychotropic practice patterns for youth. *Arch Pediatr Adolesc Med* 157: 17–25, 2003.

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