PSYCHIATRIC DIAGNOSIS AND CONCOMITANT MEDICAL TREATMENT FOR 1st AND 2nd GRADE CHILDREN

La Vonne Cornell-Swanson
William Frankenberger
and
Katie Ley
University of Wisconsin Eau Claire
and
Krista Bowman
University of Wisconsin Madison

This study examined the proportion of children in 1st and 2nd grade classes who were currently prescribed medication for psychotropic disorders. The study also examined the attitudes of 1st and 2nd grade teachers toward diagnosis of psychiatric disorders and use of psychiatric medication to treat children. Results of the current study indicate that Attention Deficit Hyperactivity Disorder (ADHD) was by far the most prevalent psychiatric disorder (80%) occurring in children in first and second grade. In the current study, approximately 5.6% (172) of the children in the sample were identified as taking one or more psychiatric medications, with 6.9 % of those treated with medication receiving multiple medications. The most prevalent medication being used was stimulants (72.5%) alone or in combination with other medications. Finally, results from the current study revealed that teachers believed medication improved the behavior and learning ability and academic achievement of children in the classroom. These beliefs may result in teacher's acceptance and promotion of treatment with medication.

The Surgeon General Mental Health Report has estimated 20% of children and adolescents suffer from mental health disorders including psychiatric, cognitive and severe emotional disabilities (Briggs-Gowan, Owens, Schwab-Stone, Leventhal, Leaf & Horwitz, 2003). The diagnosis of psychiatric disorders among school age children along with the treatment of such disorders with psychotropic medications has increased in the last 15 years (Le Fever & Dawson, 1999). Although these estimates are available there remains a paucity of information available in the literature related to the actual prevalence of psychiatric conditions and the approach to treatment in the elementary school aged population.

Incidence of Specific Disorders

Following an extensive review of the literature Weisz and Jensen (1999) reported Attention Deficit Hyperactivity Disorder (ADHD), depression, bipolar disorder, anxiety disorder, autism and obsessive compulsive disorder to be among the most commonly treated psychiatric disorders occurring in childhood. According to the American Psychiatric Association (APA, 2000), the diagnosis for Attention Deficit Hyperactivity Disorder (ADHD) alone has been estimated to occur in approximately 3-7% of school-age children. More recently estimates as high as 10% of ADHD diagnoses have been proposed (Rowland, Sandler, Umbach, Stallone, Bohlig & Naftel, 2002). An earlier study revealed a rate of psychopathology among the preadolescent age group at approximately 12% (Roberts, Attkisson, & Rosenblatt, 1998). However, rates of psychopharmacological treatment for mental health disorders remain understudied for this population (Brown & Sammons, 2002).

Incidence of Treatment with Psychiatric Medications

According to Weisz and Jensen (1999) some of the most commonly prescribed types of psychiatric medications for children include stimulant, antidepressant, antianxiety, antipsychotic, and antiseizure medications. With increasing acceptance of the use of psychopharmacology with children, medications

have become the most commonly prescribed approach for treatment of ADHD related symptoms among school age children.

Since 1990 a significant increase in the treatment of ADHD with stimulant medication has been reported. A national survey of 19 school districts conducted by Frankenberger, Lozar, and Dallas (1990) reported less than 1.5% of the students surveyed were diagnosed with ADHD and were receiving treatment with stimulants. A more recent school based survey administered by Rowland et al. (2002) revealed 10% of the 6099 children in the study were identified as having been diagnosed with ADHD and were treated with stimulant medication. Related to the increased number of children being treated with stimulant medications is the increase in stimulant production data that has been reported by the United States Drug Enforcement Administration (DEA, 2002).

Production of stimulant production has increased dramatically. According to the evidence generated by the DEA (2002) there was nearly a 900% increase in methylphenidate (Ritalin) production from 1990 to 2001. With the introduction of Concerta and Metadate, the production of methylphenidate increased by 40% from 2000 to 2002. Comprehensive figures from 1993 to 2006 reveal that the production of amphetamines (Dexedrine and Adderall) increased by 7143% (DEA, 2006).

Although research has questioned the efficacy of antidepressant medication for the treatment of children (Keller, Ryan, Strober, Klein, Kutcher, Birmaher, et al., 2001; Emslie, et al., 1997), there was a three to five fold increase in antidepressant treatment among children between 1988 and 1994 (Zito, Safer, dosReis, Gardner, Soeken, Boles, et al., 2002). Between 1998 to 2000 antidepressant use in children increased by 9.2% each year (Delate, Gelenberg, Simmons, & Motheral, 2004).

Of the antidepressants available, selective serotonin reuptake inhibitors (SSRIs) were most frequently prescribed by pediatricians and family physicians (Delate et al., 2004; Zito, et al., 2002; Rushton, Clark, & Freed, 2000). Recently the FDA issued a public health advisory regarding a potential increased risk of suicidality (suicide ideation and attempts) and worsening of depressive symptoms associated with pediatric use of SSRIs to treat major depressive disorder (FDA, 2004).

Although researchers have generally not addressed the use of combinations of medications to treat psychiatric disorders in children, a national sample of physician office visits revealed the rate of combined antidepressant and stimulant use increased 25% from 1994 to 1997 (Safer, Zito & dosReis, 2002). Rushton and Whitmore (1998) reported 30% of children in North Carolina were receiving an SSRI concurrently with a stimulant. Although it is not surprising studies reveal that children with more emotional, social, or educational difficulties were more likely to receive multiple medications (Safer et al., 2003). Bussing, Zima, and Belin (1998) found 20% of children in an elementary special education program were receiving multiple psychotropic medications. One of the most common psychotropic medication combinations was that of an antidepressant and a stimulant (Bussing et al., 1998). According to recent information, students taking multiple medications may be doing so to treat symptoms directly caused by other medications they are taking (Elias, 2006).

Despite the recent increase in use of multiple psychotropic medications, there is a lack of research supporting its use and potential risks associated. In the adult literature, consistent findings reveal that as the number of concomitant medications increases, the risk of adverse drug effects increases as well (Safer et al., 2003). Such adverse effects include an increased possibility of unfavorable drug interactions that can lead to serious physical and/or behavioral complications (Ambrosini & Sheikh, 1998).

Issues related to use of Psychiatric medication with children

There are studies that have demonstrated the positive impact of psychiatric medication on symptoms of psychiatric disorders in children. For example, the MTA Cooperative Group (MTA, 2004) revealed stimulant medication appeared to successfully treat symptoms of ADHD as long as the treatment continued. However data on other types of medications identify the potential risks associated with these medications but not the positive results.

The developmental period from early childhood to late adolescence is characterized by rapid physical, psychological, and social change; although children are being treated with the same psychiatric medications as are adults, their options for drug treatment are different due to pharmacokinetic and pharmacodynamic effects that change with age and development (Weisz & Jensen, 1999; Wiznitzer & Findling, 2003). For example the brain of a child is an evolving organ with ongoing myelination,

pruning, and the maturation of synaptic connections continuing throughout adulthood (Wiznitzer & Findling, 2003).

While the short-term effects of psychotropic medications have been documented, the long-term effects of such drugs remain under reported (Wiznitzer & Findling, 2003). The MTA Cooperative Group revealed that a study group treated with medication showed a significantly reduced growth rate and continued growth suppression (MTA, 2004). Experimental animal studies examining the effects of psychotropic agents on brain maturation during critical periods of development were absent from the literature (Weisz & Jensen, 1999) until recently. Current reports indicate that methylphenidate may have long term effects on the brain and behavior due to changes discovered in the brains of young animals that persisted into adulthood (Brandon, Marinelli, Baker & White, 2001; Carlezon, Mague & Andersen, 2003; Bolanos, Barrot, Berton, Wallace-Black & Nestler, 2003). A recent USA Today report of data released by the FDA revealed an estimated 1300 cases of negative side effects, some life threatening due to treatment with atypical antipsychotic medication (Elias, 2006).

Addressing the use of psychopharmacological treatment in the child population is complex because supporting data comes predominantly from small scale, non-blind assessments, case reports, and a few regional surveys rarely involving systematic study (Safer et al., 2003; Weisz & Jensen, 1999); while studies assessing the effectiveness of psychopharmacological treatment in children are virtually absent from the existing research being reported (Weisz & Jensen, 1999). Therefore several important questions and related issues concerning the use of antianxiety, antipsychotic, antiseizure, stimulant, and combinations of medications in the childhood population currently remain unaddressed.

The purpose of the current study was to determine the types of psychiatric disorders and the corresponding medication prescribed to children enrolled in elementary 1st and 2nd grade general education classrooms. Additionally, the study was designed to determine the most common psychiatric diagnoses in the elementary population, along with the most common multiple diagnoses and the corresponding single and multiple prescribed combinations of medication. More specifically, the study was designed to determine the proportion of children in 1st and 2nd grade classes who were currently prescribed medication for psychotropic disorders. Finally, the study examined the attitudes of 1st and 2nd grade teachers toward diagnosis of psychiatric disorders and use of psychiatric medication to treat children.

Method

Participants

Participants for the study included 525 first and second grade elementary teachers randomly selected from a tri-state area. Three lists of elementary teachers were provided by the Department of Public Instruction (DPI) in Wisconsin, and similar agencies in Minnesota and Iowa.

Measure

A questionnaire was adapted from that used in the Runheim, Frankenberger, & Hazelkorn (1996) and Hall, Irwin, Bowman, Jewett, & Frankenberger (2004) studies. The questionnaire was used to obtain information about the use of psychiatric medication with elementary age children and to assess teachers' attitudes regarding the use of psychiatric medications with elementary age children.

The questionnaire was designed to gather information through a series of 12 Likert-type questions that assessed teachers' attitudes concerning the incidence of childhood psychiatric disorders and use of psychiatric medication in the classroom. The series of Likert questions were on a 5-point scale (eg. 1=Strongly disagree, 3=Neutral, 5= Strongly agree). In addition the teachers were asked to provide demographic data and information regarding the grade level(s) they taught, their class size, and the number of children receiving medication for a psychiatric disorder(s). For each reported student receiving medication, the teachers were asked to supply information on age, gender, psychiatric diagnosis, medications(s) administered to treat the corresponding disorder(s) and whether the student qualified for the free breakfast/lunch programs in their districts. The medication lists provided in the chart were divided into the following drug classes: stimulants, antidepressants, anti-psychotics, anti-anxiety, anticonvulsants and mood stabilizers.

Procedure

A cover letter (explaining the purpose of the study and assuring anonymity), questionnaire, tea bag incentive, and return envelope were mailed to each participant. Participants were informed that by

completing the questionnaire they were giving informed consent. Two weeks after the initial mailing, a second questionnaire was sent to those who had not previously responded.

Results

Of the 525 surveys mailed out, 19 were returned not completed because the teachers were no longer teaching or no longer teaching the appropriate grades. Of the remaining 506 surveys, 152 (30%) teachers from Wisconsin, Iowa, and Minnesota completed questionnaires that included information for 3063 students enrolled in their first and second grade general education classrooms. At the beginning of the survey, participants were asked to identify the number of children in their class and the number receiving treatment with psychiatric medications. Approximately 5.6% (172) of the children in the sample were identified as taking one or more psychiatric medications. More specifically, information was available for 1386 first graders, with 58 (4.2%) identified as receiving treatment with psychiatric medications and 1500 second graders, with 103 (6.9%) receiving psychiatric medications.

Psychiatric Diagnoses of Children Enrolled in First and Second Grade

The second portion of the questionnaire asked participants to provide specific information about the types of psychiatric diagnoses and corresponding medication(s) for individual students in their classroom. Teachers provided information regarding psychiatric diagnoses for 175 children on this portion of the survey. Data from the second portion of the survey revealed that 25% of children with psychiatric diagnoses were female and 75% male. The grade distribution was 49.7% first grade and 50.3% second grade.

For children diagnosed with a psychiatric disorder, Table 1 reveals ADHD was the most common diagnosis (80%), with other diagnoses appearing much less frequently. Due to the fact that 13 (7.7%) children received multiple psychiatric diagnoses, the total number of psychiatric diagnoses equals 188 rather than 175. The most frequent multiple diagnoses were ADHD + anxiety disorder (4, 2.3%) and ADHD + depression (4, 2.3%). Other multiple disorders occurred infrequently.

Table 1
Percent of Children With Single or Multiple Psychiatric Disorders

Disorder	Number	Percentage
ADHD	140	80.0
Depression	12	6.9
Anxiety	10	5.7
Seizure Disorder	4	2.3
Bipolar	4	2.3
Other	18	10.3

* percentages include all children that were diagnosed with either single or multiple disorders

Medication Prescribed for First and Second Grade Populations

Along with the psychiatric diagnosis data, the second portion of the questionnaire asked teachers to provide individual information about a student's treatment with psychiatric medication. Data regarding psychiatric medication was collected for 160 children. Twenty percent of the children identified as receiving treatment with psychiatric medications were female and 80% were male. Of the 160 children receiving medication, 11 male children (6.9%) were identified as receiving multiple (two to six) psychiatric medications. Table 2 (next page) provides a summary of the classes of medications used to treat children in the sample. *Stimulants* were the most commonly prescribed medication (Strattera was included in this group even though it is not a stimulant per se) (72.5%) followed by *Antidepressants* (6.3%), and *Antiseizure/Mood stabilizers* (4.4%). It should be noted that antipsychotic medication was prescribed for just over 3% of the children. Again, because a child could have been taking more than one type of medication, the total in the number column was 177 rather than 167. The most frequently used *Stimulants* were Adderall (*n= 46*), Strattera (*n=19*), Ritalin (*n=17*) and Concerta (*n=16*).

Teacher Attitudes Regarding the Use of Psychotropic Medication

Teachers were asked to provide answers to 12 questions assessing their attitudes/beliefs regarding use of psychiatric medication with children. A Likert (1 to 5) scale was used to indicate teacher responses. Mean and standard deviations were calculated for each question. Answers between 1.00 and 2.00 were labeled as *disagree/strongly disagree*, those between 2.01 to 2.49 were labeled *tendency to disagree*,

Table 2
Percent of Diagnosed Children Receiving Single or Multiple Psychiatric Medications (by drug class)

Drug Class	Number	Percentage
Stimulant	116	72.5
Antidepressant	10	6.3
Antiseizure/Mood Stabilizers	7	4.4
Antipsychotic	5	3.1
Antianxiety	5	3.1
Other	34	21.3

* Percentages include all children who were receiving either single or multiple medications

means between 2.50 and 3.49 were labeled *neutral*, those between 3.50 and 3.99 were labeled *tendency to agree*, and means between 4.00 and 5.00 were labeled as agree/strongly agree.

Questions 1, 2, and 3 assessed teacher attitudes regarding whether medication tended to improve academic performance and behavior. Question 1, *Medication significantly improves academic performance in elementary school age children,* elicited an agree/strongly agree (M=4.05, SD=.795) response. Questions 2 and 3 measured whether the teachers thought medication benefited children's behavior, the mean responses for these questions fell within the agree/strongly agree category (M=4.25, SD=.649 and M=4.12, SD=.804).

Question 4 evaluated whether teachers were aware when a child had received their medication. Teachers tended to agree/strongly agree with being knowledgeable as to when a child had received his/her medication (M=4.43, SD=.739). Questions 8 and 9 assessed whether the teachers felt stimulants and antidepressants had few side effects. Answers to these questions fell within the neutral range (M=2.85, SD=.882; M=2.67, SD=.818).

Table 5
Survey Questions with Means and Standard Deviations

Children and Psychiatric Disorders/Medication Survey

THE FOLLOWING SCALE WAS USED TO RESPOND TO THE QUESTIONS BELOW:
1= Strongly disagree **2**=Disagree **3**= Neutral **4**= Agree **5**= Strongly agree

Question	*N*	*M*	*SD*
1. Medication significantly improves academic performance in elementary school age children.	146	4.05	.795
2. Medication significantly benefits students in terms of controlling their own behavior.	146	4.25	.649
3. Elementary school age children receiving mediation behave more appropriately in social situations than they would without medication.	146	4.12	.804
4. I am aware when a child has not taken his/her medication.	148	4.43	.739
5. In my experience, medication has maintain classroom control.	147	3.83	.946
6. Behavioral interventions can be as effective as medication for maintaining classroom control.	147	2.87	1.029
7. Classroom behavior control would be more difficult for teachers if children were not treated with prescription medication.	147	3.69	.969
8. I believe that stimulant medication (e.g. Adderall) have few side effects.	137	2.85	.882
9. I believe that antidepressant medication (e.g. Paxil) have few side effects.	135	2.67	.818
10. I am concerned with the long-term impact of medication on children.	148	3.84	.896
11. Medication tends to change a child's natural personality.	146	2.99	.958
12. Medication tends to improve a child's social adjustment.	146	3.87	.726

Questions 5 through 7, assessed whether teachers felt medication promoted classroom control. Question 6, *Behavioral interventions can be as effective as medication for maintaining classroom control,* elicited a neutral response (M=2.87, SD=1.029). Questions 5, *In my experience, medication has helped maintain classroom control* and question 7, *Classroom behavior control would be more difficult for teachers if children were not treated with prescription medication* evoked responses that

fell within the tendency to agree category (M=3.83, SD=.946; M=3.69, SD=.969). Question 11, *Medication tends to change a child's natural personality*, elicited a mean response of 2.99 (neutral, SD=.958), and question 12 *Medication tends to improve a child's social adjustment*, resulted in a mean response of 3.87 (tendency to agree, SD=.726).

Question 10 evaluated whether teachers were concerned with the long-term impact of medication on children. Teachers' responses fell within the tendency to agree range (M=3.84, SD=.896).

Finally, a stepwise multiple regression was completed to determine whether any of the teacher's responses could predict the ratio of students receiving medication in a particular teacher's class. Question 2, *Medication significantly benefits students in terms of controlling their own behavior*, was the only significant predictor ($p<.05$, accounting for 4% of the variance) of the ratio of children in a class receiving medication.

Discussion

Incidence of Psychiatric Disorders

Few studies have looked specifically at the prevalence of psychiatric diagnoses among children. An extensive review of existing literature conducted by Weisz and Jensen (1999) revealed ADHD, depression, bipolar disorder, anxiety disorder, autism and obsessive-compulsive disorder to be among the most commonly treated psychiatric disorders occurring in childhood even though the study did not specify actual prevalence rates. ADHD was the most common disorder found among children enrolled in early childhood special education programs; approximately 55% of children identified with one or more disorder had a diagnosis of ADHD (Totten, Frankenberger & Stroh, 2006), these data are consistent with Zito et al.'s (2000) findings. Results of the current study indicate that ADHD was by far the most prevalent psychiatric disorder (80%) occurring in children in first and second grade, followed by depression (6.9%) and anxiety (5.7%) at much lower levels.

Incidence of Treatment with Psychiatric Medications

There are no data available regarding the use of psychiatric medication for children in general, but there are data available regarding the use of psychiatric medication use for ADHD. According to Frankenberger et al., (1990) 1.47% of children were identified as having ADHD and taking stimulant medication for ADHD. The study conducted by LeFever et al. (1999) reported that the overall proportion of students in grades 2 through 5 were receiving medications for ADHD (8% in city A, 10% in city B) of the children receiving medication 90% were given methylphenidate, 5% received methylphenidate in combination with other drugs, and 10% received another ADHD medication alone. In the current study, approximately 5.6% (172) of the children in the sample were identified as taking one or more psychiatric medications, with 6.9 % of those treated with medication receiving multiple medications. By far the most prevalent medication being used were stimulants (72.5%) alone or in combination with other medications, which is consistent with the common treatment for ADHD. Of the children being treated with medications other than stimulants, 6.3% were on antidepressant, 4.4 antiseizure/mood stabilizers, 3.1% antipsychotic medication (with both Abilify and Risperdal) identified specifically, and 3.1% antianxiety medications.

Changes in Rates of Psychiatric Medication by Grade level or /Changes from first to second grade reported?

Results of the current study indicate that the diagnosis of psychiatric disorders such as ADHD, depression and anxiety alone and in combination have increased for children in first and second grade. In the study by Frankenberger et al. (1990) the majority of students receiving stimulant medications were in grades two through four, with few children receiving medication in kindergarten or first grade. According to LeFever et al. (1999) the percentage of students receiving medications generally increased with grade, the increase from second to fifth grade was from 7% to 9% in city A and from 7% to 20% in city B, with the percentage being the highest by fifth grade, 18% for city A, and 20% for city B (LeFever et al., 1999). Results of the current study indicate that the diagnosis of psychiatric disorders such as ADHD, depression and anxiety disorder alone and in combination, have increased for children in first and second grade since 1990 (Frankenberger et al., 1990). This increased rate of diagnosis has resulted in an increase in the use of multiple medications to treat multiple disorders in first and second grade.

Multiple medications and gender factors

The effects of polypharmacy are not well researched, especially with respect to young children (Safer et

al., 2003). Despite this, psychiatric medication is often utilized concomitantly for treatment of one or more mental disorders (Wilkinson, Taylor, & Holt, 2002; Wagner, 2003; Safer et al., 2003). Moline and Frankenberger (2001), in a survey of adolescents, reported students diagnosed with ADHD who often started out on low doses of stimulant medication typically had their dosage levels increased significantly and many ended up receiving treatment with multiple medications. In the current study approximately 5.6% (172) of the children in the sample were identified as taking one or more psychiatric medications, with 6.9 %, of treated children, receiving multiple medications. In similar studies (Hall & Frankenberger, 2005) 15.2% of the children in Early Behavioral Disorder (EBD) classrooms were receiving multiple psychiatric medications (two or more) and 6% of the sample was being treated with three or more medications; (Totten , Frankenberger & Stroh, 2005) found that 8% of the students in preschool special education classrooms were prescribed psychiatric medication and 32% of those children were taking multiple medications.

Of all children receiving medication in the current study, 75% were male and 25% were female. Interestingly all children taking multiple medications were male (100%). Again, there is a question of whether parents and teachers over identify male behavior as being unmanageable without medication.

Teachers' Attitudes.

Questionnaire data from the current study revealed that teachers believed medication improved the behavior and learning ability and academic achievement of children in the classroom. These beliefs may result in teacher's acceptance and promotion of treatment with medication. Teacher's attitudes related to the target effects of psychiatric medication were generally positive while their attitudes related to side effects were generally in the neutral range. Teachers also believed that behavioral control would be more difficult for teachers if children were not treated with prescription medication, and were neutral regarding the effectiveness of behavioral interventions. Finally, a stepwise multiple regression was completed to determine whether any of the teacher's responses could predict the ratio of students receiving medication in a particular teacher's class. Even though it accounted for a relatively small amount of variance (4%). Similar results were reported by Totten, Frankenberger & Stroh, 2006) and Hall et al. (2005).

Other research indicates that teachers were not aware of relevant information related to side effects of psychiatric medications (Snider, et al.,2000). In fact, some medications, such as antipsychotics and antiseizure medications, may result in a number of cognitive or memory impairments that could interfere with learning (Bower, 1991; Forness & Kavale, 1988; McKim, 2003). Furthermore, findings from a study conducted in 1988 suggested that antidepressant medication may have had adverse effects on children's classroom performance (Forness & Kavale, 1988) which challenges the teachers' belief that medication improves academic performance.

Implications

Results of the current study suggest certain implications. First, there was a 3 % increase in the number of children receiving a psychiatric diagnosis and treated with medication between the first and second grades. If this trend continued through the elementary grades, up to 15% of 4th and 5th grade children would be projected to be receiving medication. This projected rate for the upper elementary grades would be consistent with other research (Jaded, Boyle, Cunningham, Kim, & Schachar, 1999; Lefever & Dawson, 1999). A question that may be asked is whether educators have developed a tendency to overly rely on medication to control children in their classrooms. The current study did not determine whether medicated children had intensive and individualized behavioral, social, and educational interventions that were aimed at controlling and helping the child control the behaviors for which he/she was receiving medication. One has to wonder if medication has become the alternative to least restrictive environmental efforts in managing classroom behaviors. It seems important to emphasize that children do not learn from medication, it only controls symptoms while they are being treated.

Second, all (100%) of the children in this study receiving multiple medications were male. These results are similar to those of Totten, Frankenberger & Stroh, (2006) and Hall and Frankenberger (2006) where 71-83% of the children receiving psychiatric diagnoses and placed on medication were males. Again, this trend may suggest the level of energy displayed by males in the classroom is unacceptable and less tolerated then females, and more likely to be defined as a psychiatric disorder.

Finally, there continues to be a trend to treat young children with psychiatric medications. The rapid increase in the acceptance and use of medication for the treatment of psychiatric disorders and school related issues in the absence of research supporting long-term efficacy of such treatment may be

attributed to the increased acceptability by society, professionals and especially teachers. Results of the current study revealed that teachers were very much aware of the positive impact medication had on controlling the behavior of children in their classroom. However, they were less aware of the side effects and lack of long-term efficacy data related to the use of medication. This finding is important because the impact of single medications on developing children is often unclear, and the impact of multiple medications is unknown. Research reveals that the side effects of single and multiple medications range from a negative effect on growth rate to impaired development and learning in young children (MTA Cooperative Group, 2004). In the adult literature, consistent findings reveal that as the number of concomitant medications increases the risk of adverse drug effects increases as well (Safer et al., 2003). Such adverse effects include an increased possibility of unfavorable drug interactions that can lead to serious physical and/or behavioral complications (Ambrosini & Sheikh, 1998). Before medication is decided upon, it is essential that the potential positive effects of the medication be weighed against possible short and long-term negative effects.

Limitations

Approximately 30% of the questionnaires were returned which raises the question of whether the returned sample is representative of the original random sample. One reason the return rate was not higher was that the questionnaire did ask teachers to provide in-depth information that required time for them to do some research on their students. Although the sample size was smaller, the obtained data were very much in line with the results reported by Runnheim et al. (1996). In fact, the increased rate of stimulant use from the time of the Runnheim et al. (1996) study to the time of the current study agreed with other data indicating similar increases in rates of stimulant treatment with children (LeFever & Dawson, 1999). The same consistency was also found in relation to the use of multiple medications (Moline & Frankenberger, 2001). The internal validity of the study was assessed via two different methods used to identify the percent of children receiving medication. Teachers were asked to specify the number of children in their classroom and the number of children who were being treated with medication. They were also asked to provide detailed information on each child receiving medication. Both the initial number identified as receiving medication and the actual number of children for which detailed information was provided correlated exactly.

Finally, the percentage of actual medication use is likely higher than reported in this study. According to Musser et al. (1998) teachers and schools were only aware of about 86% of children receiving medication, with the additional 14% receiving medication at home without notifying the schools.

References

Ambrosini, P.J. & Sheikh, R.M. (1998). Increased plasma valproate concentrations when coadministered with guanfacine. *Journal of Child & Adolescent Psychopharmacology, 8*, 143-147.

American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revised. Washington, DC, American Psychiatric Association, 2000.

Briggs-Gowan, M. J., Owens, P. L., Schwab-Stone, M. E., Levanthal, J. M., Leaf, P. J., & Horwitz, S. M. (2003). Persistence of psychiatric disorders in pediatric settings.*Journal of the American Academy of Child and Adolescent Psychiatry, 42*, 1360-1370.

Bolanos, C.A., Barrot, M, Berton, O, Wallace-Black, D, Nestler, E.J. (2003). Methylphenidate treatment during pre-and periadolescence alters behavioral responses to emotional stimuli at adulthood. *Biological Psychiatry*, *54*(12), 1317-1329.

Bower, B. (1991). Antipsychotics evoke youthful concerns. *Science News, 140*, 276.

Brandon, C.L., Marinelli, M., Baker, L.K., White, F.J. (2001). Enhanced reactivity and vulnerability to cocaine following methylphenidate treatment in adolescent rats. *Neuropsychopharmacology*, *25*(5), 651-661.

Brown, R. T. & Sammons, M. T. (2002). Pediatric psychopharmacology: A review of new developments and recent research. *Professional Psychology: Researh and Practice, 33*, 135-147.

Bussing, R., Zima, B.T., & Belin, T. (1998). Variations in ADHD treatment among special education students. *Journal of the American Academy of Child & Adolescent Psychiatry, 37*, 968-976.

Carlezon, W. A.jr., Mague, S.D., Andersen, S.L. (2003). Enduring behavioral effects of early exposure to methylphenidate in rats. *Biological Psychiatry*, *54*(12), 1330-1337.DEA, 2002

DEA: Drug Enforcement Administration. (2002). *Yearly aggregate production quotas1990-2001* Washington, DC: Office of Public Affairs, Drug Enforcement Agency.

Delate, T., Gelenberg, A.J., Simmons, V.A., Motheral,B.R. (2004). Trends in the use of antidepressants in a national sample of commercially insured pediatric patients, 1998 to 2002. *Psychiatric Services: A Journal of the American Psychiatric Association, 55*(4), 387-391.

Elias, M. (2006, May 2) Adult antipsychotics can worsen troubles. *USA Today*, pp. D1, D2.
Emslie, G.J., Rush, J., Weinberg, W.A., Kowatch, R.A., Hughes, C.W., Carmody, T., & Rintelmann, J. (1997). A double-blind, randomized placebo-controlled trial of fluoxetine in children and adolescents with depression. *Archives of General Psychiatry*, *54*(11), 1031-1037.
Food and Drug Administration (FDA). (2004). FDA Public Health Advisory: Worsening depression and suicidality in patients being treated with antidepressant medications.
Forness, S. & Kavale, K.A. (1988). Psychopharmacologic treatment: a note on classroom effects. Journal of Learning Disabilities, *21*(3).
Frankenberger, W., Lozar, B., & Dallas, P. (1990). The use of stimulant medication to treat attention-deficit hyperactivity disorder in elementary school children. *Developmental Disabilities Bulletin, 18*, 1-13.
Gualtieri, C. T. (retrieved Feb. 15, 2005). Antidepressant side effects in children and Adolescents. *Behavioral toxicity of Antidepressants.* Retrieved from: https://www.jamcaweb.com/ncneuropsych/home/amber/antid_child_article.pdf
Guevara, J., Lozano, P., Wickizer, T., Mell, L., & Gephart, H. (2002). Psychotropic medication use in a population of children who have attention-deficit/hyperactivity disorder. *Pediatrics, 109,* 733-740.
Hall & Frankenberger (2006). Psychiatric Diagnoses and Concomitant Drug Treatment in the Early Childhood Special Education Population. *International Journal of Special Education, 21*(3).
Hall K.; Irwin, M.; Bowman, K.; Frankenberger, W.; Jewett, D. (2005). Illicit Use of Prescribed Stimulant Medication Among College Students. *Journal of American College Health, V. 53, 4, pp.167-173.*
Hall, K., Irwin, M., Bowman, K., Jewett, D., & Frankenberger, W. (2004). Comorbid diagnosis and Concomitant treatment for children with emotional and behavioral disabilities. Presented at the 18th National Conference on Undergraduate Research, 2004.
Jadad, A.R., Boyle, M., Cunningham, C., Kim, M., & Schachar, R. (1999). Treatment of attention-deficit/hyperactivity disorder. *Evidence report/technology assessment*, *11* (AHCPR Publication No. 99-E01). Rocvilee, MD: Agency for Health Care Policy and Research.
Keller, M.B., Ryan, N.D., Strober, M., Klein, R.G., Kutcher, S.P., Birmaher, B., Hagino, O.R., Koplewicz, H., Carlson, G.A., Clarke, G.N., Emslie, G.J., Feinberg, D., Geller, B., Kusumaker, V., Papatheodorou, G., Sack, W.H., Sweeney, M., Wagner, K.D., Weller, E.B., Winters, N.C., Oakes, R., & McCafferty, J.P. Efficacy of paroxetine in the treatment of adolescent major depression: a randomized, controlled trial. *Journal of the American Academy of Child & Adolescent Psychiatry*, *40*(7), 762-772.
Kondro, LeFever, G., & Dawson, K (1999). The extent of drug therapy for attention deficit hyperactivity disorder among children in public schools. *American Journal of Public Health, 89,*1359-1364.
Maag, J. W. (2002). A contextually based approach for treating depression in school-age children. *Intervention in School & Clinic, 37,* 149-156.
McKim, W. A. (2003). *Drugs and behavior: An introduction to behavioral pharmacology,* (5th ed.). New Jersey: Prentice Hall.
Moline, S. & Frankenberger, W. (2001). Use of stimulant medication for treatment of attention-deficit/hyperactivity disorder: A survey of middle and high school students' attitudes. *Psychology in the Schools, 38,* 569-584.
MTA Cooperative Group (2004). National institute of mental health multimodal treatment study of ADHD follow up: Changes in effectiveness and growthafter the end of treatment. *Pediatrics, 113,* 762-770.
Musser, C., Ahmann, P., Theye, F., Mundt, P., Broste, S., & Mueller-Rizner, N. (1998). Stimulant use and the potential for abuse in Wisconsin as reported by school administrators and longitudinally followed children. *Develop Behav Pediatr, 19*(3), 187–192.
Roberts, R. E., Attkisson, C. C., & Rosenblatt, A. (1998). Prevalence of Psychopathology among children and adolescents. *American Journal of Psychiatry, 155,* 715-725.
http://www.mentalhealth.ucla.edu/news/mhsgrpt/chapter2/sec2_1.html
Rowland, A. S., Sandler, D. P., Umbach, D. M., Stallone, L., Bohlig, M. E., Naftel, J. A. (2002). Prevalence of medication treatment for attention deficit—Hyperactivity disorder among elementary school children in Johnston County, North Carolina. *American Journal of Public Health, 92,* 231-235.
Runnheim, V. A., Frankenberger, W. R., & Hazelknorn, M. N. (1996). Medicating Students with emotional and behavioral disorders and ADHD: A state survey. *Behavioral Disorders, 21,* 306-314.
Rushton, J.L, Clark, S.J., & Freed, G.L. (2000). Primary care role in the management of childhood depression: a comparison of pediatricians and family physicians. *Pediatrics, 105*(4), 957-962.
Rushton, J.L. & Whitmire, J.T. (1998). Pediatric stimulant selective serotonin reuptake inhibitor prescription trends. *Archives of Pediatrics and Adolescent Medicine, 155*(5), 560-565.

Safer, D. J., Zito, J. M., & dosReis, S. (2002). Concomitant psychiatric medication foryouths. *American Journal of Psychiatry, 160,* 438-449.
Snider, V.E., Busch, T., & Arrowood, L. (2003). Teacher knowledge of stimulant medication and ADHD. *Remedial and Special Education, 24*(1), 46-56.
Totten, S., Frankenberger, W., & Stroh, J. (2006). Psychiatric Diagnoses and Concomitant Drug Treatment in the Early Childhood Special Education Population. Manuscript submitted for publication.
Wagner, K. D. (2003). Update on psychiatric medication. *Psychiatric Times, May,* 62
Weisz, J.R. & Jensen, P.S. (1999). Efficacy and effectiveness of child and adolescent psychotherapy and pharmacotherapy. *Mental Health Services Research, 1*(3), 125-153.
Wilkinson, G. B., Taylor, P., & Holt, J. R. (2002). Bipolar disorder in adolescence: Diagnosis and treatment. *Journal of Mental Health Counseling, 24,* 348-358.
Wiznitzer, M. & Findling, R. M. (2003). Why do psychiatric drug research in children? *Lancet, 361,* 1147-1149.
Zito, J.M, Safer, D.J., dosReis, S., Gardner, J.F., Soeken, K., Boles, M, & Lynch, F. (2002).
Rising prevalence of antidepressants among US youths. Pediatrics, 109(5), 721-727.
Zito, J. M., Safer, D. J., dosReis, S., & Gardner, J. F. et al. (2000). Trends in the prescribing of psychiatric medications to preschoolers. *JAMA, 283,* 1025-1031.