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Medication Treatment Outcomes for School-Aged Children Diagnosed with Autism

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Recent studies on the prevalence of autism indicate that approximately 1 in 200 children meet diagnostic criteria, significantly greater than rates reported just a decade ago (Blanchard, Gurka, & Blackman, 2006). Concurrently, biomedical treatments including psychotropic medication have been used with increased frequency to treat children diagnosed with autism spectrum disorders (Aman, Lam, & Van Bourgondien, 2005). Medication treatments are often sought as an adjunct to social, behavioral, and educational interventions in an attempt to improve children's academic, social, behavioral, and emotional functioning. Anticipated and unanticipated effects of medications commonly used to treat behaviors associated with autism are reviewed. Knowledge about the types and evidence-based support for different medication treatments used within this population of children is essential to integrating medical, educational, and psychosocial treatments within the school context. Finally, a simple and efficient means by which school psychologists may contribute to the evaluation of treatment services to those with autism is provided.

A dramatic rise in the prevalence rates of autism and the increased provision of special education services to students served under this diagnostic category in schools has significant implications for school psychologists' assessment and treatment practices (Blanchard, Gurka, & Blackman, 2006; Brock, Jimerson, & Hansen, 2006). With current estimates ranging from 6.7 cases per 1000 children in New Jersey (Bertrand et al., 2001), 3.4 cases per 1000 children in Atlanta (Yeargin-Allsopp et al., 2003), and 5 cases per 1000 children based on a national sample, rates of autism spectrum disorders appear to have increased since the 1980s and 1990s when estimates indicated 1 case per 1000 children. Irrespective of concerns about how these studies have defined "autistic disorder criteria," current rates indicate that schools and communities have an increased need to provide early intervention and treatment services to children exhibiting social, communication, and behavioral challenges. Recognizing and utilizing approaches with demonstrated empirical support is an important first step to developing the type of comprehensive treatment plan that is essential when working to alleviate these difficulties (Williams, Johnson, & Sukhodolsky, 2005).

One treatment that is being utilized with an increasing number of children is psychopharmacological interventions. Survey responses from parents in Ohio and North Carolina indicate that between 45% and 55% of children diagnosed with autism have been treated with one or more psychopharmacological agents (Aman, Lam, et al., 2005; Langworthy-Lam, Aman, & VanBourgondien, 2002; Witwer & Lecavalier, 2005). When considering the use of any biomedical treatment, these rates appear to be even higher (up to 65%) indicating that a wide variety of medical treatments are being sought. The overall rate of medication use within autistic populations appears to be slowly increasing (Martin, Scahill, Klin, & Volkmar, 1999), and the specific medications being used have shifted to a greater reliance on antidepressant, antipsychotic, and stimulant medications (Aman, Lam, et al., 2005). A survey study from an Autism Society chapter in North Carolina indicated that antidepressants (21%), antipsychotics (17%), and stimulants (13.9%) were the most commonly prescribed medications (Langworthy-Lam, Aman, & Van Bourgondien, 2002). Specifically, risperidone, fluoxetine, methylphenidate, clonidine, and carbamazepine were the five most reported medications utilized.

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No medications currently hold approval by the Food and Drug Administration for the treatment of autism, and educational and behavioral supports are most commonly recommended as the most appropriate first-line treatment for childhood autism (Simpson, 2004; Towbin, 2003; Volkmar, Cook, Pomeroy, Realmuto, & Tanguay, 1999). In contrast to medication efficacy for schizophrenia, attention-deficit/hyperactivity disorder, and depression, some researchers have hypothesized that the basis of autism may not lie in neurotransmitter dysfunction (Rutter, 2005). Others suggest that autism features such as repetitive and compulsive behaviors point to serotonin dysregulation and point to the use of multiple medications that target the neurotransmitter, serotonin (Martin et al., 1999). Despite this etiological uncertainty, it is common to see a variety of medication treatment practices being used for the primary purpose of symptom reduction (e.g., self-injury, stereotypies, aggression, anxiety, depression, behavioral rigidity, cognitive inflexibility) or in an attempt to help facilitate skill promotion (e.g., social interaction, nonverbal/verbal communication, attention to task) via psychosocial treatment approaches.

The predominant focus of this article is on the role and use of medications within the treatment of school-aged children diagnosed with autism. When combined with an increased focus on a response-to-intervention approach to school psychological service delivery (i.e., accountability and evidenced based practices), knowledge of biomedical treatments for autism and the means to assess how the unique needs of an individual child may be impacted by a particular treatment selected by his/her parents are essential. Readers are encouraged to review recent literature appearing within the field that looks more exclusively at the current evidence-base psychosocial/ecological interventions (Williams et al., 2005) for managing disruptive behaviors, promoting learning, and facilitating social integration commonly associated with autism. In addition, a comprehensive review of emerging research on autism spectrum disorders can be found at www.nimh.nih.gov (National Institute of Mental Health, 2004).

Behavioral Outcomes and Side Effects of Psychopharmacological Treatment

Some of the most frequently targeted symptoms of pharmacological treatments for autism include inattention, hyperactivity, aggression, anxiety, irritability, obsessions/repetitive behavior, disruptive behavior, affective instability, and social withdrawal (des Portes, Hagerman, & Hendren, 2003; Handen, Johnson, & Lubetsky, 2000; Martin et al., 1999). Psychostimulants, antidepressants, and atypical antipsychotics are among the most common medications utilized to address these behaviors and respectively address inattention/hyperactivity/impulsivity, repetitive behaviors/anxiety, and highly irritable behavior such as tantrums, aggression, and self-injury (Aman, Lam, & Van Bourgondien, 2005). A review of recent studies examining behavioral outcomes associated with pharmacological interventions for children with autism and other pervasive developmental disorders (PDDs) is presented in Table 1 and provides a comprehensive link between medications and symptom reduction or improvement in children treated for autism.

Despite the frequency of their use, a dearth of well-controlled studies exists examining the efficacy and safety of these medications. One exception is the methodologically-strong research that has been done on risperidone, an atypical antipsychotic. Converging evidence from a series of studies may ultimately lead to the future approval of this antipsychotic for the treatment of behavioral disturbance (e.g., irritability, aggression, tantrums) in autism (King & Bostic, 2006). The impact of risperidone on adaptive behavior has also been suggested within a recently published study of a subset of participants from the McCracken et al. study (Williams et al., 2006). Additional evidence exists that demonstrates fluoxetine, a Selective Serotonin Reuptake Inhibitor (SSRI) antidepressant, to be effective in treating repetitive behavior in children with autism (Posey, Erickson, Stigler, & McDougle, 2006).

Specifically, one research group is reporting nearly a 70% response rate to fluoxetine treatment within young children diagnosed with autism (DeLong, Ritch, & Burch, 2002). Yet, a similarly acting drug, fluvoxamine, has resulted in minimal benefit and substantial cost in terms of side effects within pediatric populations (McDougle, Kresch, & Posey, 2000). Large-scale, controlled trials of fluoxetine and citalopram are currently under development and likely will shed further light on the role of SSRIs in the treatment of autism (King & Bostic, 2006). Moreover, studies using a combined psychosocial and pharmacological treatment approach are also under way. Numerous other medications in addition to those reviewed have been used to treat children with autism (see Handen & Lubetsky, 2005) and future growth and investigation of "new" and combined pharmacological treatments for autism are likely to increase significantly in the next ten years (Wilens, 2004).

One of the major drawbacks of pharmacological treatments to consider is the possibility of developing side effects and the long-term impact of medication on a developing brain and body. While these are concerns for all individuals taking psychotropic medications, there appear to be an increased level of risk for children with autism. In regards to psychostimulants, children and adolescents with autism may be at greater risk for developing side effects (i.e., social withdrawal, dullness, sadness, irritability) associated with psychostimulants than typically developing children with Attention-Deficit/Hyperactivity Disorder (ADHD) (Handen, Johnson, & Lubetsky, 2000). Individuals with autism experience a high rate of seizure disorders (Kerbeshian, Burd, & Avery, 2001). Because of this, the tricyclic antidepressants (TCAs) pose a concern since they have been associated with decreased seizure threshold (Handen & Lubetsky, 2005). Issues with the SSRIs have also been raised concerning the tolerability and appropriate dosing of these medications for children with autism (Posey et al., 2006). In addition, issues related to behavioral activation and suicidal ideation are at the forefront of public skepticism about the merits of these drugs (FDA Public Health Advisory, 2004). A serious concern with the antipsychotic medications is the possibility of developing extrapyramidal (i.e., involuntary body movements) side effects (Campbell, Rapoport, & Simpson, 1999). Extrapyramidal side effects that can occur include pseudo-parkinsonism (i.e., tremors, shakiness), akathisia (i.e., uncontrollable motor restlessness) and acute dystonic reactions (i.e., marked arching of the back or eye rolling) (Handen & Lubetsky, 2005). Further difficulties arise because the extrapyramidal side effects that individuals using this drug may experience may mimic motor symptoms that are associated with autism such as restlessness, rigidity, and posturing (Kerbeshian et al., 2001). These concerns have been limited within risperidone studies, yet issues associated with sleep problems, weight gain, heart rate, and blood pressure have been raised and are important to consider within treatment cost-benefit analysis (Aman, Arnold, et al., 2005; King & Bostic, 2006; Troost et al., 2005).

Polypharmacy and Autism

Polypharmacy refers to the concurrent use of two or more medications for the treatment of psychiatric or medical conditions (Duffy et al., 2005). Children with autism typically present with several associated behavioral symptoms in addition to the core features of the disorder. These children may also have one or more co-morbid psychiatric and medical diagnoses which may necessitate the need for multiple medications in order to effectively treat distinct disorders and symptoms. While the practice of polypharmacy appears to be relatively common among children with autism (Aman, Lam, & Van Bourgondien, 2005), empirical evidence regarding the effects of polypharmacy in this population is virtually nonexistent (des Portes et al., 2003). A study conducted by Martin et al. (1999) found that nearly 30% of 109 subjects with high functioning pervasive developmental disorders were taking 2 or more psychotropic medications simultaneously. The most common combination was an SSRI with an

Table 1.
Examples of Behavioral Outcomes with Pharmacological Treatment Reported Within Recently Published Studies

atypical neuroleptic. Stigler et al. (2004) reported that in 18% of the stimulant trials they reviewed, subjects received one or more concomitant psychotropic medications. Potential benefits of polypharmacy include increasing the likelihood of response to treatment, treatment of adverse medication side effects, and utilizing lower doses of two agents to reduce adverse side effects associated with a higher dose of one psychotropic agent (Wilens, Spencer, Biederman, Wozniak, & Connor, 1995). Risks associated with polypharmacy include deleterious drug interactions and lack of medication compliance due to complicated treatment regimens (Duffy et al., 2005). The ability to establish a link between an observed behavioral outcome and the effect of a single medication is a challenging task within the context polypharmacy.

Alternative Biomedical Treatments for Autism

A gap between the lack of scientific support for the pharmacological treatment of autism and the actual practices that appear within communities widens further when you take into consideration the use of other biomedical treatments commonly found within popular internet resources such as the *Defeat Autism Now* (DAN; www.autismwebsite.com/ari) *Treatment Guidelines for Autism* (i.e., vitamin therapy, chelation treatment, digestive enzymes, casein/gluten-free diets, probiotics, antifungals, thyroid hormones, amino acids, mega-B6 with Magnesium, antibiotics). The rate of autism supplement use has been estimated to be as high as 10-17% in recent studies (Aman, Lam, & Van Bourgondien, 2005; Witwer & Lecavalier, 2005), while others estimate their use at less than 10% (Langworthy-Lam et al., 2001). The most commonly used supplements (usually in megadose) reported were vitamin B6, dimethylglycine, Super Nu-Thera, and dimethylaminoethanol (DMAE). Secretin, composed of amino acids and reportedly used by 3% of children (Witwer & Lecavalier), is one of the only biomedical treatments, outside of the traditional pychotropics, to have been studied under multi-site, randomized, and placebo-controlled conditions. The intended effects of this treatment on social and communication deficits within children with autism (N=56) was found to be minimal and limited work is now being done to develop this treatment for use within childhood autism populations (Owley et al., 2001). Finally, with respect to other alternative treatments, an estimated 15% of children are on modified diets which can be very expensive and time-consuming and little data exists beyond anecdotal report to support their use (Witwer & Lecavalier, 2005). This research also is limited due to methodological concerns and small sample sizes (Nye & Brice, 2005).

Alternative treatment approaches for autism will continue to be sought out by parents until a specific intervention approach demonstrates significant benefits across this population, which clearly outweighs the potential costs (e.g., side effects, availability, resources needed, training) associated with each. This becomes especially challenging in the context of some current etiological explanations for this condition (e.g., immunization-related) given the focus on curing this disorder rather than treating the core symptoms. Uncertainty within the treatment literature combined with the frequent use of alternative approaches provides support for the collaborative involvement of children's mental health providers (e.g., school psychologists) within physician/parent treatment decision-making. In addition, the unique biological sensitivities of this population of children, more variable response rates to medication treatment, and a greater frequency of emergent side effects result in the need to closely monitor the behavioral response of those children being treated pharmacologically (Handen & Lubetsky, 2005).

CONCLUSIONS AND IMPLICATIONS

No medications are currently FDA-approved for treating autism and other treatment approaches (i.e., behavioral and educational) are considered first line treatments. However, many children with autism are prescribed medications in an attempt to improve academic, behavioral, and social function-

ing. In addition, many parents are providing supplements and vitamins as a part of an adjunctive treatment program (Aman, Lam, & Van Bourgondin, 2005; Witwer & Lecavalier, 2005). The complexity of the individual symptom picture of children diagnosed with autism results in the need for a close examination and prioritization of treatment target behaviors. School psychologists are in the unique position of having the training and knowledge necessary to consult with teachers, parents, and physicians to establish treatment goals and to monitor treatment progress (DuPaul & Carlson, 2005). It has been recommended that the priority of every multimodal treatment plan for children with autism should be on communication and social enhancement (Towbin, 2003). Thus, a comprehensive treatment plan involving pharmacological, behavioral, and educational approaches may be typical for children with autism (Simpson, 2004). To effectively monitor the impact of these treatments, specific goals should be established and linked to the various treatment modalities that are initiated. This is especially essential when multiple medications are prescribed.

Utilizing narrow-band assessment measures that are efficient and cost-effective (e.g., GAS ratings) combined with a problem solving approach to service delivery are important skills to bring to a collaborative approach to treating autism. The spectrum nature of this condition and the resulting varying levels of dysfunction that may be experienced, presents school psychologists with a need to be knowledgeable about a wide array of potentially effective biopsychosocial treatment approaches. School psychologists report receiving minimal training in child psychopharmacology and indicate a desire for a greater level of training in this area (Carlson, Demaray, & Hunter-Oehmke, 2006). The same might also be said for evidenced-based interventions training in general (Shernoff, Kratochwill, & Stoiber, 2003). An absence of this knowledge base limits the role that school psychologists may play in evaluating medication outcomes and presents a set of ethical challenges to providing services to those who may benefit from such an approach (Carlson, Thaler, & Hirsch, 2005).

Pharmacological treatments demonstrate promise in treating specific symptoms commonly associated with autism including aggression, anxiety, agitation, cognitive inflexibility, overactivity, self-injury, and stereotypic behavior (Handen & Lubetsky, 2005). This same level of evidenced-based support has not been found within alternative treatment approaches for autism [e.g., secretin (i.e., a hormone that helps to control digestion); Handen & Hofkosh, 2005; Owley et al., 2001)], yet school psychologists need to understand both why parents seek out these treatments and what each is hypothesized to address. The availability of biomedical treatments for autism is likely to increase in the years to come especially in light of the growing prevalence of this condition within the school-aged population. Training in child psychopharmacology within the larger context of evidenced-based interventions is essential to school psychologists' ability to monitor the unique response that children have to parent-determined treatment plans.

IMPLICATIONS FOR SCHOOL PSYCHOLOGISTS

School psychologists are highly skilled to engage in consultation and assessment. These competencies can be used to identify the appropriate behavioral targets for any biopsychosocial treatment (DuPaul & Carlson, 2005). Simple questions including: "What does your child need to be successful?" or "What concerns you most about your child's behavior" or "How can we at school help you to better understand if your child's current educational programming is effective" are often all it takes to work toward operationalizing behaviors that will ultimately serve as a catalyst to monitor a child's treatment/educational progress. More elaborate approaches via best practices in functional assessment (identifying antecedents and consequences), behavioral intervention plans (managing antecedents and rethinking consequences), conjoint behavioral consultation (the process by which one can engage consultees in working toward behavior change) and progress monitoring (a response to inter-

vention approach) may also be sought and utilized when working with children with autism spectrum disorders.

Using behavioral rating scales [e.g., Behavioral Assessment System for Children- Monitor (BASC-Monitor), Kamphaus & Reynolds, 1998] at the beginning of the year with all children receiving services under the autism special education category is one efficient and effective means to prepare and be ready to engage in monitoring treatment progress within the classroom and at home. Such an approach can also then be used repeatedly across time (i.e., monthly). Specifically, the BASC Parent Monitor ratings allows for an easy way to learn about a child's treatment history including the use of any biomedical treatments, as it specifically asks questions about past treatment. It also provides some concrete ways to uncover recent behavioral improvements and to keep teachers and parents focused on which specific behaviors are of greatest concern within the home or school setting. This initial data collection effort via rating scales can then be followed up using the core structure of the Problem Identification Interview, used to validate a problem that a parent or teacher has raised regarding a child within a behavioral consultation approach (Bergan & Kratochwill, 1990). When working with parents who are not proactive in seeking outside treatment services or those who may be misinformed about the efficacy of certain treatments, the importance of working to educate parents of the nature of various intervention approaches including their empirical support is essential to treatment consultation. Communication with physicians or other treatment providers is also an essential role to play when focusing school psychological service delivery on a set of comprehensive interventions that work (Williams et al., 2005).

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