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The use of medication in the management of attention-deficit/ hyperactive disorder

Abigail S. Natvig
University of Northern Iowa

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"The Use of Medication in the Management of Attention-Deficit/ Hyperactive Disorder"
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Abigail S. Natvig
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Sandra Alper

Faculty Advisor

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(date)

Janet M. Rives

Chair, Presidential Scholars Board (date)

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The Use of Medication in the Management of Attention-Deficit/ Hyperactive Disorder

Attention-Deficit/ Hyperactive Disorder (ADHD) is a “consistently inconsistent” state of mental inattention with varying degrees of behavior abnormalities. Living with ADHD has been likened to “driving in the rain with bad windshield wipers. Everything is smudged and blurred and you’re speeding along and its really frustrating not being able to see very well.” ADHD has also been described as, “Like listening to a radio station with a lot of static and you have to strain to hear what’s going on” or “Like trying to build a house of cards in a dust storm. You have to build a structure to protect yourself from the wind before you can even start on the cards” (Hallowell, 1992, p.1).

Hallowell continues to describe ADHD as a “spilling over” of activity. The extra activity of an ADHD child is described as activity so that you can pay attention. Activities like drumming the fingers, tapping the feet, humming, whistling, looking, scratching, and doodling are all ways to expend extra energy allowing focusing to occur. The behavior of an ADHD child has been called “super-charged.” They are the children who get an idea, begin to act, but before the completion of the first action they get a second idea and begin to act on the that. The result is a rapid succession of half-completed activities.

The *American Psychiatric Association Diagnostic and Statistical Manual Fourth Edition (DSM-IV)* describes ADHD in a series of criteria shown in Table 1. As stated, “The essential feature of Attention-Deficit/ Hyperactivity Disorder is a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequent and severe than is typically observed in individuals at a comparable level of development” (1994, p. 78). This identifies the three trademark characteristics of ADHD: inattention, hyperactivity and impulsivity. The *DSM-IV* continues to define ADHD as symptomatically present before the age of seven years, causing impairment in at least two of the child’s settings and causing impairment in “appropriate social, academic, or occupational functioning.” The symptoms should not be described better by another mental disorder.

ADHD is further divided by the DSM-IV into sub-categories, varying on which characteristic symptoms are predominantly expressed. There is Attention-Deficit/ Hyperactivity Disorder, Combined Type which characterizes symptoms of both inattention and hyperactivity/ impulsivity. Attention-Deficit/ Hyperactivity Disorder, Predominantly Inattentive Type (also known as simply Attention Deficit Disorder or ADD) focuses on the inattention, but lacks significant hyperactivity/ impulsivity. Attention-Deficit/ Hyperactive Disorder, Predominantly Hyperactive-Impulsive Type focuses on symptoms of hyperactivity/ impulsivity but not as highly on inattention (while inattention was still acknowledged as significant).

As Attention-Deficit/ Hyperactivity Disorder is a newly characterized disorder, and only beginning to be fully recognized, there are a multitude of options for its management and treatment. The purpose of this paper is to weigh the benefits and risks of medications and non-pharmacological treatments used for ADHD management.

Characteristics of ADHD

Observed in ADHD children are the following characteristics: fidgeting, squirming, difficulty staying seated, easy distractibility, difficulty waiting turns, blurting out answers, shifting from one uncompleted task to another, getting up early in the morning, and difficulty following multiple directions (Evans, 1997). There is also a difficulty in controlling physical activity not related to the task at hand such as excessive pencil sharpening, falling out of their chair, finger tapping, excessive noise and high accident rate.

Socially, children with ADHD overwhelmingly have lower self-esteem, possibly due to the string of failures that the child accumulates. There can also be a lagging of social growth leading to immaturity, lack of self-awareness and sensitivity, difficulty expressing emotions and accepting responsibilities for their behavior. They are often involved in frequent fights or arguments and are typically the victim, being picked on and physically attacked due to difficulty in verbalization of thoughts and feelings. These deficient skills are a most likely a result of low self-esteem,

improper responses and a fear of criticism. (Evans, 1997)

Field expert Dr. Russell Barkley distinguishes ADHD as a personality versus a pathology. A pathology would have a symptomatic course indicating, with relative certainty, if it is present or not. ADHD exists on a continuum from severe ADHD to borderline ADHD to normal functioning. Barkley identifies three characteristics in children that are resultant of ADHD. First, children with ADHD have a delay in internalization of language 40% behind average language development for their age. This is why these children talk so much; what would normally be an internal voice in their head becomes an external vocalization. Along with this is the ability to allow language to control behavior, such as following a rule. This use of language is how children are socialized, possibly indicating diminished social skills.

Second, ADHD affects the perception of time. "Time parcels moments out into separate bits so that we can do one thing at a time" (Hallowell, 1992, p. 1). A child with ADHD will have a sense of time that is different from reality, especially with short periods of time. Real time goes much faster than they can comprehend. Their time moves slowly, leaving them consistently late, unprepared and impatient. With your sense of time comes a sense of the past, which can be equated to hindsight or common sense. They can't think ahead because we predict our future by looking at our past (Barkley, 1997).

Third, ADHD children internalize emotion much slower than other children. This results in more frequent public displays of emotion, both positive and negative (such as inappropriate outbursts of silliness or anger) and less personal motivation, as motivation and emotion are linked and psychologically the same.

The confusion with ADHD can be due to inconsistency of the behaviors. Children with ADHD can have periods of hyperfocusing (e.g., while playing Nintendo), but can't consistently pay attention in school. These children are usually drawn to highly stimulating situations which can keep up with their attention shifts. A principle misunderstanding of the disorder is that Attention Deficit Disorder can occur with or without hyperactivity. As discussed in the DSM-IV,

there is a subcategory of children who are predominately inattentive, not displaying overt hyperactivity. Also, these children are not limited in intelligence. They are usually mentally gifted and often highly imaginative and intuitive.

Diagnosis of ADHD

Diagnosis of ADHD can be difficult even with a long list of symptoms because of the subtleties of the disorder in all but the extreme cases. Also, many evaluation tools do not show a significant difference between normal functioning and ADHD. Ultimately, the diagnosis of ADHD should be the result of a team of professionals, including physicians, psychologists, and teachers, teaming with the child's parental figures to best understand all the facets of the child's life. This should include parental interviews to get medical history and circumstances where the symptoms present, teacher evaluations of school work and social interaction, physician examination of general physical health and to rule out other neurological or sensory problems and psychologist observation of the child's functioning and emotional health also ruling out other possible disorders.

Diagnostic testing for ADHD has been a field of continued research but there is still no 100% specific and universally accepted test for ADHD. One tool available is the Test of Variabilities of Attention (TOVA) which is a continuous performance test. The test is administered by a trained technician and takes approximately 30 minutes. Functioning like a video game, the patient manipulates a firing switch in response to patterns on the screen. This response is measured for accuracy, speed of reaction time (sensitive to 1/1000 of a microsecond), and variability. There is controversy over this test's effectiveness, as it was also given to distinguish candidates for radar monitoring in the first World War.

Etiology of ADHD

Diagnosis of ADHD is so difficult because the cause of the disorder is so elusive.

Despite this, there are general indications of the disorder's origin. First, ADHD can be the result of brain damage or injury. This can be due to trauma, disease, fetal exposure to alcohol or tobacco or early exposure to high levels of lead. Barkley concludes that only 5-10% of ADHD diagnoses are due to brain injury (1995). It is generally accepted that it is the orbital-frontal region of the brain that is affected. Physically, the ADHD condition may result from improper functioning or diminished activity in the area.

Advances in medical technology have also provided increased testing for ADHD causal relationships. The EEG (electroencephalograph), which measures and records brain waves, has shown that children with ADHD have less mature brain wave patterns than do children of the same age without ADHD. A study conducted by Alan Zametkin et al. in 1990 using imaging by positron emission tomography (PET scan) was used to show that adults with attention deficit symptoms who had a child diagnosed with ADHD had a "lower cerebral glucose metabolism in the promotor cortex and in the superior prefrontal cortex" (Cantwell, 1996, p. 979). Control of attention and motor activity is maintained in this area of the brain. Damages or defects could manifest as a lack of impulse control. The MRI (magnetic resonance imaging) has been used (by Hynd et al. in 1990) to study brain morphology, resulting in a suggestion that the ADHD condition results from abnormal frontal lobe anatomy (Cantwell, 1996). F. Xavier Castellanos, of the National Institute of Mental Health, who has also studied structural abnormalities with MRI (finding the frontal region of the brain more than 5% smaller on the right side in ADHD boys) warns, "It's only slightly better than phrenology. Now we're just measuring the bumps on the inside of the brain" (Leutwyler, 1996, p. 12).

Barkley describes the disorder as neurogenetic, having a root in both neurology and genetics. ADHD is described as an inefficiency in the area of the brain which neurologically controls impulses and assists with attention focusing and stimulus selection (Rief, 1993). The most accepted research into the specific neurochemical causal agent of the ADHD brain

identifies a regulatory imbalance in the catecholamine neurotransmitters norepinephrine, epinephrine and dopamine. Catecholamines are responsible for attention processing and stimulus response. The dysregulation confuses the attention and mental processing pathway (Pliszka, et.al, 1996).

Aside from neurobiological causes, ADHD is a genetic disposition. In monozygotic twins, if one twin is diagnosed with ADHD, 51% of the time the other twin is also ADHD (Livingston, 1997); dizygotic twins hold a 33% dual diagnosis relationship, the same as any sibling to sibling relationship (Cantwell, 1996). Also, in cases where ADHD children have been adopted there is a higher corresponding relationship of parental or other familial ADHD in the child's family of origin. Russell Barkley notes if an adult has ADHD then 50% of their kids will have ADHD and if one child is ADHD there is a 30-35% chance of siblings also being diagnosed (1997).

Causation could be due to complications in utero or during delivery. Prenatal exposure to nicotine and alcohol can cause increased odds of ADHD due to the effect on the developing frontal lobe of the brain. In a research review, Cantwell states that a small portion of the ADHD cases are related to conditions such as fragile X syndrome, fetal alcohol syndrome, children born at very low birth weights and a "very rare, genetically transmitted thyroid disorder that can present behaviorally with symptoms of [ADHD]" (1996, p. 979). Causal agents are not established to be "bad" parenting, too much television, food additives, refined sugar or vitamin/mineral deficiencies.

Opinions of the presence of ADHD

Statistically, ADHD is present in roughly 5-10% of the population. Boys seem to be five to nine times (general population to clinical settings) more likely to be diagnosed with ADHD than are girls. Girls are more likely to be diagnosed with ADHD, primarily inattentive (Livingston, 1997). ADHD is described as a lifelong disorder. Barkley discusses a long-term study of 160 ADHD children that resulted in 80% of the participants having symptoms that persisted through

the teenage years and 65% of the participants having symptoms that persisted through adulthood. Of these 160 people studied, 20-30% had no difficulties by adulthood. (Barkley, 1997) The breakdown of symptom types showed in a Tennessee study by Wolraich in 1996 that 4.7% of the population were primarily inattentive, 3.4% were primarily hyperactive and 4.4% were combined. A similar study conducted in Germany by Baumgaertel et al. in 1995 showed that 9.0% were primarily inattentive, 3.9% were primarily hyperactive and 4.8% were combined. (Cantwell, 1996)

Public attitude of ADHD is varied and controversial. There are those people to acknowledge the presence of the disorder in society, but refuse to see that ADHD is affecting their own children. This is an extension of the ethical NIMBY (Not In My Back Yard) principle depicting a person's denial of personal involvement. Parents who are confronted with a suggestion that their child may have ADHD usually move through the traditional grief cycle, including a stage of denial of the problem.

Some people are adamantly opposed to the discussion of such a disorder's existence. Richard Smelter, et al. in 1996 states, "From this, we suggest that the natural propensity of individuals to seek from societal censure by claiming the role of victim as opposed to that of victimizer," (1996, p. 430) arguing that society seeks disorders to take away responsibility for behaviors. They continue to state, boldly, that "all children are not educable in the conventional sense, that is, within the walls of the school" (1996, p. 432). Thomas Armstrong continues, "It's time to stop and take stock of this 'disorder' and decide whether it really exists or is instead more a manifestation of society's need to have such a disorder" (1996, p. 428).

Others who disagree with the diagnostic criteria argue that the evaluations are subjective and normalized according to a variable standard. The rating scales used by educators and parents depend on subjective judgments that may be clouded by emotion. One physician, who is also the mother of a child classified ADHD says, "I began pointing out to people that my child is capable of long periods of concentration when he is watching his favorite sci-fi video or

examining the inner workings of a pin-tumbler lock. I notice that the next year's definition states that some kids with [ADHD] are capable of normal attention in certain specific circumstances. Poof. A few thousand more kids instantly fall into the definition" (Armstrong, 1996, p. 425). Peg Dawson formerly of the National Association of School Psychologists says, "We don't think that a proliferation of labels is the best way to address the [ADHD] issue. It's in the best interest of all children that we stop creating categories of exclusion and start responding to the needs of individual children" (Armstrong, 1996, p. 428).

Proponents of the ADHD condition would agree, in part, with Dawson's statement. These children have individual needs, but the ADHD condition is a reality. Acknowledging that ADHD is a valid condition, the issue then becomes how is treatment accomplished? While there are alternatives for treatment options, successful treatment of ADHD usually involves medication for the treatment of the physical neurotransmitter dysfunction and teaching behavior modification programs to help restructure the child's control of their actions. The argument over medication use tends to be just as, if not more, controversial than the existence of ADHD itself and much more publicized.

Using stimulant medications for ADHD

Overwhelmingly, field experts (e.g., Dr. Russell Barkley, Dr. Larry Silver, etc.) advocate the usage of medication. Medication for the management of ADHD involves a couple varieties of drugs. The largest category of drugs used for ADHD symptoms are the stimulant medications. These medications seem to work by increasing the amount of time that the catecholamine neurotransmitters are effective in the brain synapses, which decreases hyperactivity and inattention problems. "While there remain many people fearful of adverse effects of stimulants because of various media hype, these are in fact safe and effective medications in well over 95% of all cases. Sophisticated medical management is vital." "When remedial measures alone are insufficient, the decision to prescribe medication will depend upon the physician's assessment of

the chronicity and severity of the child's symptoms" (PDR, 1998, p. 1897). There are three main stimulant medications used in ADHD treatment: Ritalin, Dexdrene and Cylert.

Ritalin.

Ritalin (generically methylphenidate) is the most commonly used stimulant for ADHD management. Physicians and educators specializing in ADHD management acknowledge that brand name Ritalin works more effectively than does the generic methylphenidate. The 1998 *Physicians Desk Reference (PDR)* characterizes Ritalin hydrochloride as a mild central nervous system stimulant acting by activating the brain stem arousal system and cortex. The specific biochemical route of action is not clearly understood, nor is the mechanism for its behavioral effect on children. It is a relatively fast acting drug with onset of action within twenty to thirty minutes and peak plasma concentrations within 1.9 hours for children on the regular tablets (as opposed to the time released form at 4.7 hours). It is almost completely excreted in urine in the main metabolite ritalinic acid. The absorption of Ritalin is noted as inconsistent ranging from 80-90% to only 30-40% absorption. Ritalin, in the normal tablet, acts for two to four hours, with benefits seen for approximately three hours.

Ritalin is manufactured by Ciba/ Geneva and is available in short acting tablets of 5 mg, 10 mg and 20 mg, along with a sustained release form of 20 mg. Effects of Ritalin have been noted to include a rebound effect of over-agitation and/or anxiety when the medication effect wears off. "Rebound' is a deterioration in behavior that follows the wearing off of short-acting stimulants" (Cantwell, 1996, p. 985). It can last thirty minutes or more, resulting in a symptom display that is worse than normal. Other side effects noted have been a decrease in appetite and sleep and short term growth suppression (not long-term). It is not recommended for children under the age of six and "drug holidays" (periods without medication usage) are recommended to evaluate the child's condition. Ritalin is not recommended for patients with anxiety, tension, agitation, motor tics, familial history of Tourette's syndrome, hypersensitivity to methylphenidate,

or psychotic conditions as it may exacerbate these symptoms. Also, if a patient has a history of seizures, Ritalin is not recommended as it may lower the convulsive threshold.

Dexdrine.

The second most common stimulant prescribed to ADHD patients is Dexdrine (generically dextroamphetamine sulfate). Dexdrine is available in short-acting scored tablets of 5 mg and sustained release forms of 5 mg, 10 mg and 15 mg. The onset of action for Dexdrine is approximately thirty minutes and it remains effective for 3.5 to 4.5 hours, which is slightly longer than Ritalin. The sustained release form of the drug is more effective in delivery and lasts six to eight hours. The mechanism of behavioral effect in children is unknown. Dexdrine is categorized as an amphetamine (cautionary because of high potential for abuse and addiction) in the *PDR*. This stimulant is almost completely absorbed, as opposed to the variance in Ritalin absorption, however absorption can be reduced by co-ingestion of Vitamin C. Dexdrine is almost twice as potent as Ritalin (5 mg Dexdrine = 10 mg Ritalin), and it has a smoother onset and drop-off action, minimizing the rebound anxiety and agitation in most people.

Dexdrine has a significant list of possible drug interactions, so medication usage should be carefully monitored by a physician. It is not recommended for children under the age of three or for patients with a history of drug abuse, agitated states, advanced arteriosclerosis, cardiovascular disease, hypertension, hyperthyroidism and glaucoma. Side effects can include many cardiovascular, central nervous system, gastrointestinal, allergic and endocrine reactions, but most commonly observed is a decrease in appetite, especially in the sustained released forms.

Cylert.

The third most commonly used stimulant medication is Cylert (generically called pemoline, but no generic tablet is available). Cylert is made by Abbott and is available in 18.75 mg, 37.5 mg and 75 mg strength tablets. This has a slow onset of action, approximately one

hour, and it must be taken for three to four weeks before clinical benefit is observed. It is also important to note that the systemic level of Cylert must be maintained and medication discontinuation should be done slowly. The *PDR* classifies Cylert as a mild central nervous system stimulant, different from both Dexdrine and Ritalin. As with the other stimulants, the biochemical mechanism of action for Cylert is unknown. Cylert reaches peak plasma concentrations in two to four hours.

Cylert is metabolized by the liver, leading to the major precautionary concern of liver functioning being effected by the drug. Though uncommon, the production of liver enzyme can increase and jaundice and hepatitis can appear. Comprehensive liver enzyme evaluation is suggested just prior to medication and at three to six month intervals while using Cylert. Any changes in liver functioning, while most are reversible, indicate a discontinuation of the drug. In addition to this, Cylert can cause insomnia, appetite suppression and an exacerbation of motor and phonic tics (also Tourette's syndrome). Patients with impaired liver functioning or hypersensitivity to the drug are not recommended for treatment with Cylert.

Adderall.

In addition to the three major drugs, there is a fourth stimulant drug that has recently been FDA approved for ADHD management (in 1996). Adderall is a combination of dextroamphetamine and amphetamine in both short and long-acting preparations. The mix of ingredients delivers a combination of attention as well as impulse control benefits. It has a smooth and more subtle onset and drop-off action and can last six to nine hours, easily covering a school day. The *PDR* classifies Adderall as an amphetamine with central nervous system stimulant activity. Again, the mechanism of action is unknown and an anorexic side effect may be observed. The same limitations and precautions as are listed for Dexdrine are seen due to the amphetamine classification.

Stimulant medication is by far the most prescribed and the most successful form of medication management for ADHD. A trial of one of these three medications gives a successful response rate of 85-90% (Cantwell, 1996). "The most widely studied and cost effective treatment for ADHD is the prescription of psychostimulant medication, such as Ritalin. These medications can lead to improvements in on-task behaviors, impulsivity, social behavior, compliance and academic productivity in as many as 70-80% of children with ADHD" (Thompson, 1996, p. 434).

Other medications used for ADHD management

Because ADHD often has co-occurring (comorbid) symptoms of depression and anxiety, there are some drugs that are prescribed to attend to those symptoms as well. The drug family of anti-depressants have been prescribed for ADHD children with these comorbid conditions, and also for those children who have had a personal or family history of motor disorders (tics, Tourette's, etc.) or other forms of contra-indicated psychosis (paranoia, schizophrenia, etc.). Anti-depressants have advantages over stimulant medication when children either do not respond to stimulants or they exhibit unmanageable side effects. This form of medication is also useful when the child is experiencing anxiety or panic reactions, bed-wetting or other sleep disturbances (probably due to the sedative effect). Anti-depressants commonly used are Norpramin or Pertofrane, generically desipramine; Tofranil, generically imipramine or Elavil, generically amitriptyline. It is believed that the anti-depressants act in a similar way as the stimulants, increasing the amount of time the neurotransmitters dopamine and norepinephrine are active in the brain.

The anti-depressants require a longer amount of time to show a positive behavioral effect, sometimes up to three or four weeks. Benefits of this medication type include a consistent medication level in the bloodstream, reducing the crucial issue of dose timing. Also, the drugs do not show the rebound effect that the stimulant medications can. One major side

effect of these drugs is possible abnormal heart rhythms. Physicians prescribing anti-depressants will conduct an electrocardiogram to measure heart functioning and rhythms prior to prescription and as a continued monitoring effort. Medication is begun at a low dose and gradually increased, with medication blood levels carefully monitored. Minor side effects can include constipation, dry mouth, blurred vision, and increased sweating. To avoid drug interaction, all additional medication usage should be cleared with a physician.

Also in the anti-depressant category is Prozac, generically fluoxetine. Prozac's chemical functioning is different from the other anti-depressants. This drug acts to increase the effective time of serotonin, a chemical related to the inhibition of aggressive behavior. Because of this, it has been found to benefit highly aggressive ADHD children and those with a comorbid mood disorder. Prozac doesn't seem to cause heart abnormalities and the beneficial effects may be noticed somewhat sooner than with the other anti-depressants. Side effects may include nausea, mild weight fluctuations, headaches, anxiety or nervousness, excessive sweating or insomnia. Increased thoughts of suicide have surfaced in adults taking Prozac. If children exhibit these symptoms, medication should be immediately discontinued.

Other types of medications can be used in ADHD management. One is Clonidine (generically catapres) which is commonly used to treat hypertension in adults. It is also used for schizophrenia, manic-depression, obsessive-compulsive disorder, panic disorder, serious eating disorders and involuntary movements as in Tourette's syndrome (Barkley, 1995). In ADHD, Clonidine may "reduce the motor hyperactivity and impulsiveness... [it] may also increase a child's cooperativeness with tasks and directions and increase the child's tolerance for frustration" (Barkley, 1995, p. 268). Because this drug is not as effective in improving sustained attention or distractibility, but useful in reducing aggressive and impulsive behavior, this medicine may be best for children with ADHD and a comorbid oppositional defiant disorder or conduct disorder. Clonidine is also indicated in ADHD children with tics or a familial history of tic disorders. Sedation occurs as the major side effect of this drug, requiring approximately two to

four weeks for improvement to be seen. Other side effects may included headache, dizziness, nausea, abnormal heart rhythms, nightmares, weight gain, and depression/anxiety. Clonidine may be taken by mouth or by a transdermal skin patch.

Opinions of medication usage in ADHD management

Medication usage in children is an issue that involves strong and contradicting opinions, especially when medications such as stimulants and anti-depressants are prescribed for children.

There are those researchers who argue that ADHD is a personality trait, not a mental illness. By medicating these children we may be changing their personality and this is wrong (Lloyd, 1997). Child psychiatrist Carl L. Kline of the University of British Columbia generalizes that the use of Ritalin is comparable to prescribing illegal drugs to children to cover up the fact that the cause of the problems is unknown (Livingston, 1997). In support of management by education reform, it is asserted that because it is inconvenient to change the school system environment, we don't think twice about changing the brain of the person who has to live in it (Livingston, 1997). The increased usage of Ritalin (U.S. citizens consume 90% of the 8.5 tons of methylphenidate produced yearly) has caused calls for investigation from the U.S. Drug Enforcement Agency. All these objection points are from those who agree that ADHD is a valid disorder; those that argue against the existence of ADHD are even less likely support medication.

Rebuttal of these points by experts and physicians seems to center on the idea that if a child is truly ADHD and is dealing with impairment in functioning due to the disorder, then medication is indicated to be a positive decision. Ritalin is a relatively safe medication and over the last twenty-five years has built up a good safety record, despite the adverse media coverage.

As far as side effects go, though 20% of children may experience effects, these are mild and usually short-lived (Johnston, 1991). While medicine won't compensate for cognitive deficits (there is no overall long term improvement in cognitive functioning) or resolve emotional problems, it can expand attention capabilities, lessen impulsive behaviors and decrease

inappropriate motor activity allowing a child the opportunity to stay still to work on the other issues.

Socially, as medication results in a decrease in undesirable behaviors (impulsivity and hyperactivity, aggression, defiance, etc.) acceptance by the child's peers increases leading to less social ostracism and a better attitude about themselves that can carry positively into adulthood. "The only way to tell whether a medication will be effective in appropriately selected candidates is to try it in a well-monitored trial over a two to three week period" (Johnston, 1991).

Barkley asserts that the best thing that we can do for ADHD is to allow children to take medication, therefore the best physicians are using medication. He argues that if 5% of children have ADHD and we are at about 2% of children using medicines, we are not over medicating but undermedicating. Ritalin usage has increased over the last ten years, but we have not even approached the projected need (Barkley, 1997). Local physician Dr. Martha Ochoa (personal communication, April 4, 1998) commented that for children who are truly ADHD there are dramatic and beneficial improvements with medication use.

Non-pharmacological approaches to ADHD management

Because of the controversy over the use of medication, there have been a number of alternative treatments that have been suggested. Showing some promise is a treatment using biofeedback with EEG, originated by Dr. Joel Lubar Ph. D. from Tennessee in the 1980's. Adults with attention deficits have shown improvement in desired brain activity after biofeedback. EEG biofeedback works by giving a child biological information about his/her brain activity. Over time, the child learns to increase the desired brain activity related to sustaining attention and to decrease the undesired activity such as daydreaming or distraction. The training is recommended to include forty to eighty sessions spread over several months. Large group studies on children have not been conducted to date and conclusions as to the effectiveness are shaky. Professionals seem to be waiting for studies to give some conclusive information

concerning the long term beneficiary effects of the treatment. Aside from the effectiveness for the treatment, the cost is in the thousands of dollars, and as it is an unproven treatment insurance coverage is doubtful.

There is also a system of thought that asserts that vitamin and mineral deficiencies are the causal agents for ADHD symptoms. The theory holds that "some people have a genetic abnormality which results in increased requirement for vitamins and minerals" (Goldstein and Ingersoll, 1993, p. 148). If these requirements are not fulfilled a variety of illnesses can occur. The popularity of this treatment approach has been fueled by the general feeling that vitamins are healthy and "natural" substances. According to the initial studies, high vitamin doses were recommended for hyperactivity and attention deficiencies and mineral supplements were supposed to remedy learning and behavior problems. Despite the established occurrences of vitamin deficiency related diseases such as scurvy, there is no scientific evidence to the effectiveness of the vitamins or minerals on ADHD symptoms. In fact, overly high doses of vitamins and minerals can be toxic causing even liver or heart damage. In 1973 the American Psychiatric Association concluded that this treatment was not justified and the American Academy of Pediatrics agreed in 1976 (Goldstein and Ingersoll, 1993). ADHD expert Russell Barkley also highly discourages parents from pursuing vitamin and mineral treatment for their children.

Similar to vitamin treatment, there is also a theory for treating ADHD children by removing all food additives, preservatives, chemicals or inhalants such as flavorings or colorings from the child's diet. This is based on research done by Benjamin Feingold (*Why Your Child Is Hyperactive*) in the 1970's. Strict adherence to the diet is essential and quite difficult. Usually an entire family is called to participate, removing all offending foods from the household. Also similar to this, is the idea that refined sugar increases hyperactivity. For both of these ideas, no clinical studies, well-controlled and with proper peer-review, have found any supporting evidence whatsoever of these theories. Ingersoll and Goldstein stated, "[We] consistently failed to find

support for Dr. Feingold's approach" (1995, p. 147). While eating a good breakfast has been found to be beneficial, no alterations limiting food in the child's diet have been recommended.

These alternative treatments, while valid systems of approach, should only be investigated under the direction of expert advice from a psychologist or physician or educator. Also included in these treatments would be martial arts training, relating allergies to behavior, Bach's flower remedies and limiting television or video game exposure.

Conclusions of approaches to ADHD management

The treatment of ADHD is quite controversial and opinions run high on either side of the issue. Should medication be used for the treatment of ADHD? The position taken by the American Academy of Pediatrics is that "medication for children with attention deficit disorder should never be used as an isolated treatment. Proper classroom placement, physical education programs, behavior modification, counseling, and provision of structure should be used before a trial of pharmacotherapy is attempted" (Armstrong, 1995, p. 48).

Physicians, in general, seem to agree with local family physician Dr. M. Ochoa that the use of medication should be and is tightly regulated. Prescriptions must be handwritten and signed by the physician. The medication (Ritalin for example) can not be prescribed with refills. It must be obtained monthly, direct from the physician. In keeping with the position above, the use of medication should only be recommended after thorough evaluation, both medically and in school. Behavior modification programs should be attempted and other behavior controls to externalize what children are having difficulty internalizing (time, speech, emotions). However, as stated before, when a child is truly ADHD and has not benefited from the other treatment attempts, medication seems to be an extremely effective tool for the management of ADHD.

Educators also seem to, in general, have similar opinions and beliefs on the use of medication for ADHD. However, just because a child is on medication doesn't mean that a teacher's responsibilities end. As the person with the most access detailed and pertinent

information concerning a child's ADHD symptom display, their input becomes crucial in the management of the medication. "The physician is the prescriber. It is usually the teacher who evaluates the effectiveness of the medication, since it can best be gauged by performance in the classroom, not in the examining room" (Johnston, 1991, p. 39). The teacher is vital in evaluation of medication effectiveness and in requesting an evaluation for determining an ADHD diagnosis. There are some educators who strictly adhere to treatment with structure and discipline, using behavior modification techniques such as token economies for controlling ADHD symptoms in the classroom. Opposite this are those educators who endorse medication after thorough evaluation. For most, according to area resource teacher Connie Sullivan (personal communication, April 2, 1998), the improvement in the child's on task behavior, social interaction and work quality (most evident in dramatic improvements in handwriting samples) show medication to be a beneficial supplementary treatment.

The use of medication has been heralded by the media as a crutch for parents and teachers who just didn't "have control" over the children under their care. The increase of stimulant medication in the last ten years in children does cause reason to examine the medication use. The attitude of our American society is that a pill will fix any problem that we have. This attitude, transferred to parents with difficult children, can cause situations where medication is sought for children who are not ADHD. Undoubtedly, there are situations where medications are overused and misused. The use of these therapeutic medications for illegal recreation has increased, with Ritalin obtaining street names such as Vitamin R, Jiffy or Skip. However, the misuse and overuse of medication cannot be the standard by which we judge the effectiveness of proper use. Properly used, medication can be a valuable and extremely beneficial tool for the successful management of Attention Deficit Hyperactive Disorder.

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Table 1. Diagnostic criteria taken from the *Diagnostic and Statistical Manual, 4th ed.*

A. Either (1) or (2):

(1) six (or more) of the symptoms of inattention

Inattention

- (a) often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
- (b) often has difficulty sustaining attention in tasks or play activities
- (c) often does not seem to listen when spoken to directly
- (d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace
- (e) often has difficulty organizing tasks and activities
- (f) often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort
- (g) often loses things necessary for tasks or activities
- (h) is often easily distracted by extraneous stimuli
- (i) is often forgetful in daily activities

(2) six (or more) of the symptoms of hyperactivity- impulsivity

Hyperactivity

- (a) often fidgets with hands or feet or squirms in seat
- (b) often leaves seat in classroom or other times when seating is expected
- (c) often runs about or climbs excessively when it is not appropriate
- (d) often has difficulty playing or engaging in leisure activities quietly
- (e) is often "on the go" or often acts as if "driven by a motor"
- (f) often talks excessively

Impulsivity

- (g) often blurts out answers before questions have been completed
- (h) often has difficulty awaiting turn
- (i) often interrupts or intrudes on others

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before the age of 7

C. Some impairment from the symptoms is present in two or more settings

D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder.