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Attention-Deficit/Hyperactivity Disorder: An Educational Cultural Model

Jane Lundholm-Brown, RN and Mary E. Dildy, RN

ABSTRACT: This article gives a brief history and background of Attention Deficit Hyperactivity Disorder (ADHD) in childhood. A review of the medical model, including the diagnostic criteria and recommended protocols for treatment, is presented. An educational cultural model based on a holistic approach in assessing causes of hyperactivity and inattention is described. The Educational Cultural Model (ECM) synthesizes the effects of significant extrinsic factors in the life of the child, such as family dynamics, societal influences, and the educational system, and intrinsic factors, such as individual temperament, energy levels, learning style, giftedness, and personal interests. In addition to the primary purpose of comparing the medical model of ADHD to the conceptual ECM, this article is designed to stimulate thinking about different ways to view ADHD.

KEY WORDS: Attention-deficit/hyperactivity disorder, hyperactivity, impulsivity, inattention, temperament

INTRODUCTION

School nurses are on the front lines of health care in the United States. As a result, we have an excellent opportunity to positively affect the physical, emotional, and educational well-being of America's children. Accompanying this opportunity is a tremendous responsibility. The school nurse is frequently asked to provide information to both parents and health care providers regarding prescribed treatments and their effects. Appropriate health counseling cannot occur without a complete understanding of a diagnosis and the rationale for its treatments. It is vital, therefore, for school nurses to maintain an updated knowledge base that is supported by fact and not by speculation.

The purpose of this article is to review the current medical model of Attention-Deficit/Hyperactivity Disorder (ADHD) and contrast it with the conceptual Educational Cultural Model (ECM) developed by the au-

thors. In the ECM, the child is not considered physiologically disordered. Instead, children are recognized as individuals with varying levels of energy who differ in temperament, attention span, intensity, mood, distractibility, intelligence, talent, and personal interests. Additional consideration will be given to the potential effects of family dynamics and societal influences on the behavior and attentiveness of children. This article also examines the current diagnostic process and issues relating to psychotropic medications, reviews classroom accommodations and interventions, and points out some inconsistencies in recently published reports.

BACKGROUND

Attention Deficit Disorder (ADD) was first defined as a mental disorder when it appeared in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) of the American Psychiatric Association (APA, 1980). In 1987, ADD was reclassified as Attention-Deficit/Hyperactivity Disorder (APA, 1987). The current edition of that publication (DSM-IV) includes the subtypes with and without hyperactivity, inattentive type, and ADHD combined type (APA, 1994). For the purpose of this discussion, the authors will refer to the diagnosis as ADHD.

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The medical model of ADHD is based on the theory the child suffers from a physiological brain disorder. The diagnosis is dependent on observations of the child's behavior in the home, the classroom, and in the community. These observations are documented and compared with the list of criteria that appears in the DSM-IV (APA, 1994). These criteria specify, "There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning . . ." (pp. 83–85). Impairment caused by these symptoms must be continuous, be present in two or more settings, and should appear before age 7 years. The DSM-IV also defines three subtypes: (a) ADHD inattentive type (having no hyperactivity); (b) ADHD hyperactive-impulsive type; and (c) ADHD combined type (APA, 1994).

The American Academy of Child and Adolescent Psychiatry (AACAP) recommends the use of a multimodal approach as the best treatment practice for ADHD (1991). Ideally, treatment should include a comprehensive program to support and educate the child's parents and teachers in behavioral management, placing the child in an appropriate academic environment, and treatment with medication (AACAP, 1991). The MTA Cooperative Group (MTA) recently reinforced this multimodal approach (1999).

In summary, after the diagnostic process has been completed, the American Academy of Pediatrics (AAP, 2000) and other experts (AACAP, 1991; Hales, Yudofsky, & Talbott, 1994; MTA, 1999; U.S. Surgeon General [USSG], 1999) recommend implementing a multimodal approach to treatment. This process includes the use of appropriate accommodations and interventions to assist the child with remembering and completing assigned tasks. Behavior modification techniques are employed that may involve the use of incentives and rewards. Parent training programs, school-based interventions focusing on classroom behavior management, and frequent two-way communication between the school and the home, are the psycho-social/academic-based components. The final component is the prescribing and monitoring of the effects of psychotropic medications.

AN EDUCATIONAL CULTURAL MODEL

Other than a comprehensive physical examination, including vision and hearing screening, there is no medical component in the ECM. The ECM encompasses the combined effects of the child's individual temperament, activity level, academic ability and placement, learning style, family and social relationships, and societal influences. This conceptual model developed by the authors envisions the child as a unique individual whose behavior and inattentiveness may be a result of this combination of intrinsic and extrinsic elements.

More than 2000 years ago, Hippocrates wrote about

individuals having a predisposition to act in certain ways. Today this is known as Temperament Theory. The modern study of temperament began with the work of Thomas, Chess, and associates. Their work was reported in the New York Longitudinal Study (NYLS) in the late 1950s (Carey, 1997; Hales et al., 1994; USSG, 1999). This study identified nine temperament characteristics present at birth that have an important influence on development throughout the life span. The nine characteristics are as follows:

- Activity level—the amount of physical motion exhibited during the day.
- Persistence—the extent of continuation of behavior with or without interruption.
- Distractibility—the ease of being interrupted by sound, light, and other factors unrelated to behavior.
- Initial reaction—response to novel situations, whether approaching or withdrawing.
- Adaptability—the ease of changing behavior in a socially desirable direction.
- Mood—the quality of emotional expression, positive or negative.
- Intensity—the amount of energy exhibited in emotional expression.
- Sensitivity—the degree to which the person reacts to light, sound, and other factors.
- Regularity—the extent to which patterns of eating, sleeping, elimination, and so forth are consistent or inconsistent from day to day.

Hartmann (1997) placed temperament in a more cultural and historical perspective when he described children identified as ADHD as hunters living in a world of farmers. Farmers are not easily distracted and have a great dedication to the task at hand. They pace themselves for the long haul and can visualize long-term options. They do not get bored easily and pay close attention to details. Hunter personalities, on the other hand, are quite different. Hunters are quick, impulsive, and able to display enormous energy for short periods of time, but they lack staying power. They are not interested in irrelevant details and have a need for instant results. Hunters are easily bored, whereas farmers are patient and cautious.

Another component of the ECM is the theory of Multiple Intelligences. Almost 20 years ago, Gardner (1993) recognized traditional views about intelligence and educational approaches were insufficient. "The design of my ideal school of the future is based upon two assumptions. The first is that not all people have the same interests and abilities; and not all of us learn in the same way" (p. 10). He argued that intelligence can be defined in more accurate and constructive ways if consideration is given to more than the traditional language and mathematical skills seen on current intelligence tests. Gardner identified seven different intelligences that should be evaluated and nurtured in

Table 1. Behaviors Associated With Attention-Deficit/Hyperactivity Disorder (ADHD) and Giftedness

| Behaviors Associated With ADHD | Behaviors Associated With Giftedness |
|---|---|
| Poorly sustained attention in almost all situations | Poor attention, boredom, and daydreaming in specific situations |
| Diminished persistence on tasks not having immediate consequences | Low tolerance for persistence on tasks that seem irrelevant |
| Impulsivity, poor delay of gratification | Judgment lags behind development of intellect |
| Impaired adherence to commands to regulate or inhibit behavior in social contexts | Intensity may lead to power struggles with authorities |
| More active or restless than other children | High activity level, may need less sleep |
| Difficulty adhering to rules and regulations | Questions rules, customs, and traditions |

Note. Data are from Cramond (1995) and Reid and McGuire (1995).

children: linguistic intelligence, logical-mathematical intelligence, spatial intelligence, musical intelligence, bodily kinesthetic ability, interpersonal intelligence, and intrapersonal intelligence. Gardner (1993) suggests that every individual possesses each of these intelligences to some degree, but each person has particular strengths in one or more of these areas. This theory of multiple intelligences is accepted and used in the educational field and encourages educators to seek and to teach to a broader range of talents and skills (Brualdi, 1996).

Behavioral symptoms also may indicate signs of a child's creativity and potential giftedness (Cramond, 1995; Reid & McGuire, 1995). Table 1 offers a comparison of common behaviors associated with ADHD and those of the gifted/talented child. Gifted or creative children are frequently overactive, sloppy, disorganized, and forgetful and tend to daydream. They are demanding and assertive, argumentative and cynical, temperamental and moody, and occasionally emotional or withdrawn. If the educational environment is not challenging enough and is insensitive to learning styles and temperament, the child may respond by displaying negative behaviors (Cramond, 1995; Reid & McGuire, 1995). Cramond also noted that it is both important and helpful to assist children in finding creative outlets to channel their energy and restlessness into more creative endeavors.

The conceptual ECM recognizes the child as a normal individual with a special temperament, personality, learning ability and style, and his or her own particular interests. In addition, emphasis should be placed on the impact of sociocultural issues and family dynamics, as well as the effect school-related stressors might have on the child's learning process and overall behavior. A comprehensive assessment should include a complete physical examination to rule out

any chemical toxicity, endocrine imbalances, lead encephalopathy, audiological or vision deficits, and other neurological abnormalities.

COMPARISON OF THE TWO MODELS

Prevalence

Recently published studies have shown geographic variation in the prevalence of the ADHD diagnosis (Brown et al, 2001; LeFever, Dawson, & Morrow, 1999; National Institutes of Health [NIH], 1998). Because the prescribing rate of methylphenidate is an acceptable indicator in determining the prevalence of ADHD, studies tracking its use reliably reflect the prevalence of the diagnosis (LeFever et al., 1999). The NIH estimates the rate of occurrence to be 3 to 5% in the United States (1998). Brown and colleagues (2001) reported prevalence rates at 4 to 12% in the 6- to 12 year-old age group. A study conducted in southeastern Virginia revealed 8 to 10% prevalence with as many as 17% of white, 5th-grade boys receiving medication for ADHD during the school day (LeFever et al., 1999). No nationwide study reporting the numbers of children "diagnosed with or treated for ADHD has been conducted" (LeFever et al., 1999, p. 1359).

Causes and the Diagnostic Process

The cause of ADHD remains unknown, and there are no medical tests to confirm the diagnosis (Brown et al., 2001; NIH, 1998; USSG, 1999). The AAP (2000) states, "diagnostic tests are not routinely indicated to establish the diagnosis of ADHD" (p. 1167). After reviewing studies that do establish a link between delays in cognitive functioning (including attention problems) and elevated lead levels for example, Brown and colleagues (2001) did not recommend testing children for elevated blood lead because most children will have normal lead levels by school age. Brain imaging studies have also proven to be ineffective in diagnosing ADHD (AAP, 2000; Brown et al., 2001; NIH, 1998; USSG, 1999). Similarly, studies of thyroid function (AAP, 2000) and EEG are also not recommended (Brown et al., 2001).

In May 2000, the AAP published guidelines for diagnosing ADHD in children 6 to 12 years of age. These recommendations are as follows:

- The child's primary care physician should initiate the evaluation for ADHD.
- To qualify for the diagnosis of ADHD, all DSM-IV criteria must be met.
- Assessment requires evidence of core symptoms to be collected directly from parents and caregivers and will include age of onset, duration of symptoms, and degree of functional impairment.
- Assessment also requires that evidence of core symptoms be collected directly from the class-

room teacher (or other school official), including duration of symptoms, degree of impairment, and associated conditions.

- Evaluation should include assessment for potential coexisting conditions.
- Other diagnostic tests are not routinely indicated.

The medical model of ADHD places little emphasis on the educational and cultural factors that may contribute to the cause of behavioral and attention problems in children; in contrast, the Educational Cultural Model stresses these factors. Consider the following facts from the Children's Defense Fund (2001):

- In 1998, 5.4 million children lived in households headed by a relative other than a parent.
- 39% of these children lived in households with no parent present.
- An estimated 547,000 children were in foster care as of March 31, 1999.
- Today in the United States, 10.8 million children are uninsured and are more than 4 times likely than insured children to have an unmet medical need.
- Only 23% of all families with children younger than age 6 have one parent working and one parent who stays at home.
- In 1997, close to 1 million children were confirmed victims of abuse or neglect.

The U.S. Surgeon General's Report on Mental Health (1999) also acknowledges the following risk factors for a child's development of mental disorders: prenatal damage from the effects of alcohol, illegal drugs, and tobacco; low birth weight; difficult temperament; external factors such as poverty, deprivation, abuse, and neglect; unsatisfactory relationships; and exposure to traumatic events.

In addition to changes in family structure, families today face a multitude of financial challenges. With the increase in the number of single-parent and dual-income families, there is also a rise in the number of children who are placed in daycare. Very young children may spend the entire day in the care of nonfamily members. Older children may be placed in daycare facilities before and after school. The absence of a stay-at-home parent has also led to an increase in the number of children leaving and arriving home from school without adult supervision (latchkey children). With so many working parents, divorced parents, and single-parent situations, today's parents may be unable to spend as much time with their children as did the parents of previous generations. In the absence of a responsible adult, children may be left to care for themselves and to make decisions about their own immediate behavior, safety, and health. Without adult guidance, young children are not capable of making wise and appropriate choices, may act impulsively without

rational thought, and may not learn the acceptable social skills necessary for success in school. Because the primary institution of socialization is the family unit, stable home environments are critical for the healthy growth and development of children.

The entertainment media, including television, movies, video recordings, and the Internet, have had an immense impact on the learning and behavior of children. In today's culture, children are used to being constantly stimulated and entertained. Instant results, fast food, loud music, real-time international communication, and 10-second news stories define current lifestyle. Slow paced and quiet environments may be almost intolerable for children (and adults) who are accustomed to living in a fast-paced culture. As a result, this inability to cope with slowness may have a devastating effect in the classroom, where a child is expected to sit quietly for extended periods of time and engage in learning activities that require sitting still, listening, thinking, and problem solving. An online report on media use by the National Institute on Media and the Family (NIMF; 2001) quotes prominent researchers (sources listed below are included in the NIMF report) regarding the following interesting facts:

- The average time spent in front of electronic screens (televisions, computers, video games) is nearly 4.5 hours per day among 2- to 17-year-olds (Annenberg Public Policy Center, 1999).
- The average American child grows up in a home with two televisions, three tape players, two video cassette players, two compact disc players, one video game player, and one computer (Kaiser Family Foundation, 1999).
- Thirty-one percent of children surveyed (aged 10–17) reported having seen a pornographic site on the Internet (National Public Radio, 2000).
- The average child and adolescent spends between 21 and 28 hours per week watching television (Bryant, 1994).
- Studies show that children who watch cartoons or other purely entertainment television shows during their preschool years do more poorly on prereading skills at age 5 (MacBeth, 1996).
- Children who are heavy television viewers (over 3–4 hours per day) have the poorest reading skills (Searls, 1985).

In addition to the amount of time children spend watching movies and television, interacting with video games, and browsing the Internet, the subject matter to which they are being exposed also has an impact on their behavior. Extended exposure to violence, sexual promiscuity, and profanity teaches children to be insensitive to the needs of others and to accept inappropriate behavior as normal (NIMF, 2001).

The medical model of ADHD stresses the importance of subjective observations from others, whereas

the ECM places a great deal of value on the individual child's input. The AAP (2000) offers suggestions for generalized questions directed to parents regarding the child's behavior, learning problems, overall happiness, social interactions with peers, and schoolwork. The ECM solicits input directly from the child regarding family issues, dietary and sleep habits, general health, physical discomfort in the classroom, study habits, learning style, need for physical activity during the day, specific interests, relationships with teachers and peers, and significant events in his or her life. Rather than assume the child is impaired, a direct interview with him or her about ways to enhance attention and concentration may lead to simple solutions to problems that may otherwise be perceived as complex (Edelman, 2000).

Treatment

Because the child is considered to have a disability, the medical model of ADHD involves the implementation of a multimodal treatment approach, combining psychosocial and pharmacological interventions (AACAP, 1991; AAP, 2000; Brown et al., 2001; Hales et al., 1994; MTA, 1999; USSG, 1999). Ideally, treatment should include a comprehensive program to support and educate the child's parents and teachers in behavioral management, placing the child in an appropriate academic environment, and treatment with medications. Parents and teachers are involved in implementing accommodations and interventions to assist the child. These may be included in the child's Individualized Education Plan (IEP) or 504 Plan and may include adjustment in the child's classroom environment and activities, reduction of classroom distractions, and seating in an area of the classroom that is conducive to attentiveness. Adjusting the type and number of assignments given, giving only one assignment at a time, breaking up assignments into smaller tasks, and altering or reducing the written workload also may be suggested. Parents may be encouraged to assist the child with the use of lists, schedules, alarm clocks, incentive plans, frequent feedback, and token-reward systems (Hales et al., 1994; USSG, 1999).

The goal of ECM is to empower children. Rather than viewing them as incapable of controlling their actions and abilities, they are encouraged to learn how to learn. Stein's (1999) Caregivers Skills Program (CSP), for example, is designed to minimize "preceding cues and emphasizes instead parents' rigorous enforcement of consequent events to disruptive behaviors" (p. 65). The child is expected to think, be attentive, and monitor his or her own actions without help from others. He or she will learn to control his or her behavior in all environments and will improve behavior and academics without medication. In a follow-up done 1 year after the completion of the original study, 34 of the original 37 participants were located and evaluat-

ed. Although all participants met the DSM-IV criteria for ADHD at the study's inception, none met the criteria at follow-up. Stein concluded that medication is not required to successfully change the targeted behaviors, including inattention and hyperactivity.

The use of medication in treating behavioral, academic, and social problems is not part of the ECM; however, it is a primary component in the multimodal, medical treatment of ADHD (AACAP, 1991; MTA, 1999; USSG, 1999). Because stimulants such as methylphenidate (Ritalin, Concerta, Methylin, Metadate), dextroamphetamine (Dexedrine, Dextrostat), and a mixture of amphetamine salts (Adderall) are effective in 75 to 90% of those diagnosed with ADHD, they are the most commonly prescribed pharmacological treatment (Hales et al., 1994; USSG, 1999). Low-dose antidepressants such as bupropion (Wellbutrin) are sometimes prescribed for those who cannot tolerate the side effects of stimulants (USSG, 1999). Other antidepressants, including the selective serotonin reuptake inhibitors (SSRIs) or tricyclics, may be prescribed for managing tics and coexisting mood disorders or "if rebound effects of the psychostimulants are disruptive" (Hales et al., 1994, p. 743). Alpha-adrenergic blockers, such as clonidine (Catapres) and guanfacine (Tenex) have been effective for ADHD when there is a coexisting tic disorder. Some neuroleptics have been used on occasion, and antiepileptics such as carbamazepine (Tegretol) and valproic acid (Depakote) are sometimes prescribed as mood stabilizers (USSG, 1999). Although lithium carbonate (Lithobid) has not been shown to be effective for ADHD (USSG, 1999), it is considered helpful if impulsivity, inattention, and hyperactivity coexist with bipolar disorder (Hales et al., 1994).

DISCUSSION

Even though ADHD is the most commonly diagnosed behavioral disorder in children today (AAP, 2000; Brown et al., 2001; LeFever et al., 1999; NIH, 1998; USSG, 1999), controversy regarding its validity as a medical disorder as well as its treatment with psychotropic medications exists. As previously noted, there are no medical tests to confirm the diagnosis, and despite many research claims made in professional journals, best-selling books, and the popular media, a definitive cause for the core symptoms of ADHD has not been scientifically established (AAP, 2000; Brown et al., 2001; NIH, 1998; USSG, 1999). Often media reports and press releases do not accurately inform the public. For example, one widely publicized study claimed that functional brain differences have been identified in the frontal lobes of the brains of children diagnosed with ADHD (Silberstein et al., 1998). A closer examination of the study, however, reveals what may be a serious flaw in reporting the research results. In the study, 15 of the 17 participants in the ADHD

Table 2. A Summary of Frequently Prescribed Medications for Attention-Deficit/Hyperactivity Disorder and Related Conditions

| Medication Classification | Potential Adverse Effects | Nursing Considerations: Implications and Actions |
|--|---|---|
| All psychotropic medications | CNS: headaches, dizziness, vision disturbances, moodiness/sadness/apathy, sleep disturbances/drowsiness/insomnia, nervousness/tremors, or fatigue GI: abdominal pain, anorexia, nausea, dry mouth, changes in bowel habits CV: bradycardia/tachycardia, arrhythmias, palpitations, hypotension/hypertension, vasodilation, angina (rare) Other: skin rashes, urticaria, increased perspiration, weight changes | Record height/weight at onset of therapy and monitor regularly (every 6 months is ideal), document changes Record blood pressure/pulse at onset of therapy and monitor; report all significant changes to physician Record vision screening at onset of therapy and monitor regularly (annually is ideal) Observe/report/record mood, behavioral and emotional changes Give medications at mealtime or with snack to prevent stomachache/nausea Evaluate compliance with drug regimen Instruct patient to take drug as prescribed; do not discontinue abruptly; avoid alcohol; consult with physician before taking any OTC drugs |
| Stimulants: Ritalin, Methylin, Concerta, Metadate, Dextroamphetamine, Adderall, Desoxyn, Gradumet | Slowed growth, tics, aggravation of Tourette's syndrome, depression, aggression, irritability, problems with visual accommodation, seizures May experience withdrawal or rebound as medication effect wears off Rare instances of psychosis have been reported, including visual/auditory hallucinations | Immediately report seizures, overstimulated appearance/behaviors, impaired thinking, hallucinations or bizarre behavior, skin rashes, palpitations, vomiting |
| Antidepressants • SSRIs: Prozac, Paxil, Luvox, Zoloft • Tricyclics: Norpramin, Tofranil, Aventyl/Pamelor, Anafranil • Atypicals: Effexor, Desyrel, Wellbutrin | Dysmenorrhea, impotence, alopecia, asthenia Additional warnings for tricyclics: confusion/delusions, cardiac arrhythmias, disturbances in coordination, numbness/tingling in extremities | Report disorientation, difficulty concentrating, excessive sedation, fever, or suicidal ideation Instruct patient to avoid prolonged exposure to sunlight and to wear sunscreen |
| Antihypertensives: Catapres, Tenex | Weight gain, leg cramps, muscle/joint pain, angina, Raynaud's phenomenon, weakness, contact dermatitis with transdermal patch (Catapres) | Instruct patient NOT to discontinue medication without close medical supervision Observe for local skin irritation when using transdermal patch; report/treat appropriately |
| Antiepileptics: Tegretol, Depakote, Neurontin | Ataxia, confusion, abnormal dreams, tardive dyskinesia, vertigo, sedation, thinking abnormalities, hyperactivity, urinary frequency, syncope, vasodilation Abnormal liver function tests/hepatic failure (rare), adenopathy, lymphadenopathy | If severity of adverse effects is sufficient to warrant discontinuation of medication, patient must be aware that doing so may lead to seizures or status epilepticus Withdrawal must be under close supervision of a physician |

Note. From Karch (2000) and Spratto and Woods (2001). CNS = central nervous system; CV = cardiovascular; GI = gastrointestinal; OTC = over-the-counter; SSRIs = selective serotonin reuptake inhibitors.

group had been receiving Ritalin from 1 to 3 years; their medication was withheld 24 hours before testing. The authors did not address the possibility that the functional brain differences could have been related to the prior use of that medication. It is important to read actual research rather than to rely on abstracts and media summaries.

Aforementioned citations of professional literature have shown 3 to 17% of children in the United States are suspected of having a disorder that may or may not be medically based. It should also be noted that pharmacologic therapy has not been proven to provide long-term improvements in social skills, academics, peer relationships, or achievement (MTA, 1999;

NIH, 1998; USSG, 1999). Adverse effects of stimulants are numerous. The most common side effects are insomnia, decreased appetite, stomachaches, headaches, and nervousness (Table 2). Although many physicians consider these effects to be minor, a stomachache or headache may not feel "minor" to a small child. Physical distress could indeed interfere with concentration in the classroom. It is also worthwhile to note that many coexisting conditions, such as anxiety, aggressive behavior, and depression (AAP, 2000; Brown et al., 2001), are also potential adverse effects of medications used to treat ADHD (Karch, 2000; Spratto & Woods, 2001). These adverse effects have been documented during the clinical trials of the medications, yet phy-

sicians often prescribe additional medication to treat these effects. As additional medications are prescribed to counteract the adverse effects of the initial prescription, there may be a compounding of physical or emotional discomfort (or both). In addition, the long-term effects of most psychotropic medications on the child's growing and developing brain have not been satisfactorily explored (Jensen, 1998; NIH, 1998; Vitiello, 1998).

Controversy regarding the potential for abuse of many of the psychotropic medications prescribed for ADHD is another dilemma. Many of the medications are Schedule II controlled substances (Feussner, 1998; International Narcotics Control Board, 2000) under the Controlled Substances Act (CSA); this identifies them as having a high potential for abuse or addiction. Conflicting government reports underscore this controversy. A Drug Enforcement Administration (DEA) official's report states MPH [methylphenidate] is associated with criminal drug trafficking activities (Feussner, 1998). One year later, the U.S. Surgeon General's Report on Mental Health (1999) contradicted the DEA. "While stimulants clearly have abuse potential, the rate of lifetime nonmedical methylphenidate use has not significantly increased since methylphenidate was introduced as a treatment for ADHD" (p. 150). Feussner's report (1998) offers a detailed description of abuse via emergency room reports, poison control centers, law enforcement encounters, and adolescent drug treatment centers.

The process of evaluating and diagnosing a child with ADHD has also been shown to lack consistency. The AAP (2000) emphasizes the need for consistent diagnostic guidelines and relies heavily on the criteria of the DSM-IV: "Children who meet diagnostic criteria for the behavioral symptoms of ADHD but who demonstrate no functional impairment do not meet the diagnostic criteria for ADHD" (p. 1160). Brown and colleagues (2001) supported the AAP with emphasis: "Without due consideration of the DSM-IV functional impairment criterion, the frequency of ADHD diagnosis may be spuriously high." (In the published citation, no other page numbers were listed. In the pdf. version of the document this quote is from page #3 of 11.) The AAP (2000) readily admitted that "current criteria do not take into account gender differences or developmental variations in behavior. Furthermore, the behavioral characteristics specified in the DSM-IV, despite efforts to standardize them, remain subjective and may be interpreted differently by different observers" (p. 1163). Also, diagnostic rating scales are deemed subject to bias and their results may "convey a false sense of validity and must be interpreted in the context of the overall evaluation of the child" (p. 1164). These guidelines, the purpose of which is to provide a standard protocol for diagnosing ADHD, appear to be devoid of standards.

Although the medical model of ADHD has incon-

sistencies in prevalence, medical management, and the diagnostic process, there are no such limitations in the Educational Cultural Model. When children are viewed as disabled with a physiological brain condition, the medical model dictates treatment involving academic and social accommodations to overcome the child's weaknesses combined with medication to balance neurochemicals. If, however, the child is recognized as a unique individual, behavioral and academic interventions designed to teach responsibility and to reward learning are deemed more appropriate and may prove beneficial.

IMPLICATIONS FOR SCHOOL NURSING PRACTICE

School nurses are in a unique position to observe the physical, emotional, and social aspects of children's lives and are key health care providers in school systems today. Although school nurses play a minor role in the actual diagnosis of ADHD, their input can be critical during the assessment phase. School nurses may add a family-centered developmental perspective and knowledge of health care to the assessment process. From prior interactions with siblings and family members, the school nurse may have valuable knowledge about the family including health history and cultural values. As with any medical diagnosis, the school nurse has an obligation to be objective and conscientious when working with children having the ADHD diagnosis. Implementation of the basic components of the nursing process, assessment, diagnosis, planning, intervention, and evaluating outcomes, remains unchanged.

The component of the medical model of ADHD with the greatest impact on school nursing practice is undoubtedly the pharmacologic intervention. State laws and specific school district policies may vary regarding school medication protocols (Reutzel, Patel, & Myers, 2001), but school nurses must be aware of the policies applicable to their practice. School nurses should be aware of policies governing use of experimental, naturopathic, and homeopathic medications in the school setting. Furthermore, it is important to be knowledgeable about school system policies regulating medication administration during school fieldtrips. What is the individual school policy regarding students who refuse to take their prescribed medication (Hootman, Schwab, & Gelfman, 2001)? Do secure facilities for storage of controlled substances exist in the school clinic (Reutzel et al., 2001)? Where such school policies do not exist, school nurses are urged to be proactive in initiating their development and implementation.

Although standard nursing practice involves administering medications in the dose and manner prescribed, at the correct time, and to the correct individual, responsibility for monitoring and documenting both the therapeutic and adverse effects of medi-

Table 3. Maximum Daily Doses of Medications Used to Treat Attention-Deficit/Hyperactivity Disorder

| Medication | Maximum Daily Dosage |
|------------|--|
| Ritalin | 50–60 mg for children over age 6 |
| Ritalin SR | 60 mg for children over age 6 |
| Concerta | 54 mg for children over age 6 |
| Methylin | 60 mg for children over age 6 |
| Dexedrine | 0.1–0.5 mg/kg for children aged 3–6; 40 mg for children over age 6 |
| Dextrostat | 0.1–0.5 mg/kg for children aged 3–6; 40 mg for children over age 6 |
| Adderall | 0.1–0.5 mg/kg for children aged 3–6; 40 mg for children over age 6 |
| Wellbutrin | No pediatric doses available |
| Prozac | Not recommended for children under age 5; safety in children not established |
| Clonidine | 0.3 mg/day |
| Tenex | No pediatric doses available |
| Tegretol | 400 mg for children under age 6; 1000 mg for children aged 6–15; 1200 mg for children aged 15 and over |
| Depakote | 60 mg/kg for children over age 10 |

Note. From Spratto and Woods (2001).

cation during school hours also is within the scope of practice of the school nurse. Before administering any medication in school, the school nurse should review each medication order and positively identify each medication provided by the parent or guardian. Knowledge of the medication, safe dosage (Table 3), and clarity of instructions for administration are essential. Finally, compatibility with other medical treatments and academic schedules must be considered.

Medications used to treat the diagnosis of ADHD are not brain specific. They have the potential to affect the entire body of the child. Many of these medications have side effects that may be minor and temporary (Karch, 2000; Spratto & Woods, 2001); however, there are some potentially serious adverse effects (Table 2). Medications with dosages exceeding established medical safety standards should not be administered in school (Hootman et al., 2001). Based on a thorough review, the school nurse should develop an individualized medication plan for each student. The school nurse has an obligation to make critical observations for all medication effects on a regular basis, during brief encounters, and often under less than ideal conditions.

CONCLUSION

In addition to the primary purpose of comparing the medical model of ADHD to the conceptual Educational Cultural Model, this article is intended to stimulate thinking about ADHD and its treatment. School nurses must be powerful advocates for all children, but to do so they must maintain an updated knowledge base to feel confident enough to challenge the status quo when it becomes necessary. The diagnosis of Attention-Deficit/Hyperactivity Disorder may

indeed conjure up emotion and controversy, but as advocates for children, school nurses are professionally obliged to objectively advise and to educate about all aspects of this diagnosis. To accept and accommodate inappropriate behavior, impulsivity, and inattentiveness may not be a constructive approach in guiding children toward the independence of adulthood. As Stein stated, "These techniques may be viewed as reinforcing a child's dependency on constant help from external sources" (1999, p. 63).

All children are not alike in temperament or demeanor; therefore, they should not be expected to attend equally at home, in school, and in the community. To diagnose and label a child as ADHD and to offer accommodations, interventions, and medication may serve only to suppress diversity, creativity, and individuality. Subjective observation alone or in combination with testing for learning disabilities does not address other possible intrinsic and extrinsic factors that may be contributing to the child's behavior and inattention. Failure to closely examine the child's hereditary, social, family, and educational environments in an attempt to determine the factors contributing to behavior and inattention may lead to inappropriate diagnosing, labeling, and accommodating. It is critical to place inattention and socially inappropriate behavior in the proper context of the whole child. Finally, as McCubbin and Cohen (1999) reminded us, "A wealth of projects in the education and child health literature shows how the structure of schools, school programs, and classrooms can help create better teaching environments for restless and distractible children" (p. 95). Perhaps instead of molding the child to fit the system, now is the time to consider reshaping the system itself.

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