

Memory Training Lifts Some ADHD Symptoms

BY BRUCE JANCIN
Denver Bureau

VIENNA — A computerized method of systematically training working memory provides a nonpharmacologic means of reducing inattentive symptoms in children who have attention-deficit/hyperactivity disorder, Dr. Torkel Klingberg said at the annual congress of the European College of Neuropsychopharmacology.

In his randomized, double-blind, multicenter, controlled trial, parents of children who received this proprietary method of working memory training rated their children's ADHD symptoms as improved by 1 full standard deviation more than did parents of children in the control arm.

The improvement was seen largely in inattentive symptoms, where the treatment effect size was greater than typically reported with stimulant medication.

Working memory training had far less impact on hyperactivity symptoms, according to Dr. Klingberg, professor of cognitive neuroscience at the Karolinska Institute, Stockholm.

The improvements in both working memory and ADHD symptoms were sustained long term in this study of 53 children aged 7-12 years who were not on stimulant medication. Eighty-five percent of the improvement in visuospatial working memory documented on the span-board task at the conclusion of 5 weeks of training was retained at retesting 5 months later. A 2-week training refresher boosted the improvement back up to 100%.

Forty-two percent of blinded parents indicated in interviews that the reduction in their children's ADHD symptoms noted at the end of training was maintained over the next 5 months, and an additional 40% noticed further symptomatic improvement during that period. The most likely explanation for this surprising late additional symptomatic improvement is that the gains in working memory enabled children to more effectively tackle homework and other complex tasks, Dr. Klingberg said.

The children also showed significant improvements in laboratory tasks measuring complex reasoning, response inhibition, and verbal working memory. This indicates that the effects of working memory training had spread to nontrained executive function tasks, he said.

Working memory is the ability to retain information during a delay, typically a few seconds, then retrieve it to perform such everyday tasks as solving problems, remembering instructions, reading with comprehension, and con-

trolling attention. Working memory is part of executive function, and working memory deficits are common in ADHD.

Dr. Klingberg is credited as a pioneer in demonstrating that working memory can be improved with training, and that this yields gains in other executive functions and a reduction in ADHD symptoms.

The computer-based working memory training program used in his studies was developed by Cogmed, a Stockholm-based company. Dr. Klingberg is the company's founder and senior scientific adviser. Participants in his multicenter, double-blind trial trained for 40 minutes per day, 5 days per week, for 5 weeks. The program includes an algorithm for increasing the difficulty of the working memory tasks. Children do the exercises on the Internet, and that enables their activity to be monitored.

The neuroanatomic rationale for working memory training in ADHD comes from a magnetic resonance brain imaging study Dr. Klingberg and his colleagues conducted in healthy young adults. Working memory training resulted in increased brain activity in the dorsolateral prefrontal cortex and the parietal association cortex while subjects performed a working memory task. These areas of the brain have been implicated in ADHD, he noted.

The use of stimulant medication does not interfere with working memory training. In fact, a slightly greater improvement in working memory was documented in 70 ADHD patients on medication than in 66 not on medication in a study now in press, Dr. Klingberg said.

The efficacy of the Cogmed program was recently confirmed in an independent validation study conducted by Bradley S. Gibson, Ph.D., director of the perception and attention laboratory at the University of Notre Dame (Ind.).

In addition, clinical trials are underway evaluating working memory training in patients with stroke or traumatic brain injury.

Dr. Joseph Biederman, session cochair, and professor of psychiatry at Harvard Medical School, Boston, noted that not all children with ADHD have working memory deficits, and he asked what point there was in providing working memory training to those without such deficits.

"To be honest, we don't know all of the effects here," Dr. Klingberg replied. "But we know that [methylphenidate] improves cognitive abilities in all subjects, irrespective of whether they have ADHD, perhaps by improving supportive executive functioning." ■



The improvement in ADHD symptoms was sustained long term in this study of 53 children aged 7-12 years.

DR. KLINGBERG

ADHD Goes Underdiagnosed in Chinese Immigrant Families

BY SHERRY BOSCHERT
San Francisco Bureau

SAN FRANCISCO — A very low prevalence of childhood attention-deficit/hyperactivity disorder in New York's Chinatown seems to be attributable to underdiagnosis of the disorder, Dr. Loretta Au said at a poster presentation at the annual meeting of the American Academy of Pediatrics.

Surveys of 225 Chinese immigrant parents, 178 school faculty (mostly teachers), and 20 community-based pediatricians found that parents lacked knowledge about ADHD, and school staff and physicians reported a wide variety of obstacles to diagnosis and management of ADHD in the Chinatown population, reported Dr. Au of the Charles B. Wang Community Health Center, New York, and her associates.

The investigators designed the study after noticing that the 0.1%-0.2% prevalence rate for childhood ADHD at the center was far below reported prevalence rates of 4%-12% for broader populations. Faculty at five Chinatown elementary schools reported that 8% of 3,039 children in the schools exhibited signs of ADHD—a rate consistent with the wider prevalence rates for ADHD—but only 1% of students had official diagnoses for the disorder, the school survey found.

Among 20 pediatricians who returned anonymous, mailed surveys, 70% said they are aware of criteria and guidelines for diagnosing ADHD, and 95% said they would like more help in diagnosing the disorder. A majority of the pediatricians (65%) referred patients with suspected ADHD to neurologists or mental health providers for official diagnosis. Not handling ADHD in the patients' medical home may contribute to underdiagnosis, Dr. Au suggested.

Surveys that were translated into Chinese were answered by parents at schools and the Community Health Center. Only 15% knew of the symptoms of ADHD, and 33% knew about the consequences of untreated ADHD, although 58% of parents

had heard of the disorder. Seventy-seven percent were interested in learning more, and 83% said their community needs more information on ADHD.

Common obstacles to diagnosis and management of ADHD reported by physicians were a lack of coordinated care (21%), parental mistrust or denial of the diagnosis (20%), and lack of bilingual mental health services (20%). School faculty also pointed to a lack of coordinated care (18%), a lack of resources (17%), and families who don't follow through on recommendations for evaluation or treatment of ADHD (23%).

"Especially for Chinese patients, and I think in general for Asian patients, ADHD is something that they might have heard about, but they might not think about as a medical problem," Dr. Au said. "They might not present the problem to their doctor unless asked [about it]. They might be ashamed about the fact that their child is not doing well in school. A lot of times they are concerned about hyperactivity symptoms, but they might blame themselves for poor parenting."

Busy pediatricians might not pursue the topic if parents don't ask about it, she added. In Chinese immigrant populations, "the pediatrician needs to be asking about school performance, and telling parents about ADHD, and that it might impact upon school performance and the future of the child."

The results of the study prompted her center to take several steps to increase education and coordination of care around ADHD. The center staff created bilingual educational materials for parents and translated ADHD assessment scales into Chinese. An ADHD multidisciplinary team meets monthly on care management.

A pediatrician and social worker from the center give bilingual workshops in the community and schools about ADHD. Clinicians meet quarterly with school counselors, who now fax referrals to the center for children with ADHD symptoms. The center also started a support group for parents of children with ADHD. ■

Study Links Food Additives to Hyperactive Behavior in Children

Children given a beverage containing certain mixtures of food colors and the preservative sodium benzoate showed significantly increased hyperactivity scores in a British randomized, controlled, crossover study.

Findings of the study, which included 153 3-year-olds and 144 8- and 9-year-old children selected from the general population, support previous research suggesting that certain food additives can exacerbate hyperactive behaviors such as inattention, impulsivity, and overactivity.

Investigators in the current study said their findings suggest that the policy makers review the use of food additives because of their potential negative effect on edu-

cation (Lancet 2007 Sept. 6 [Epub doi:10.1016/S0140-6736(07)61306-3]).

"This study provides evidence of deleterious effects of (additives) on children's behaviour with data from a whole population sample," wrote the researchers, led by Jim Stevenson, Ph.D., of the University of Southampton's School of Psychology.

"These findings show that adverse effects are not just seen in children with extreme hyperactivity (i.e., ADHD), but can also be seen in the general population and across the range of severities of hyperactivity."

The study was funded by a grant from the United Kingdom's Food Standards Agency.

—Jonathan Gardner