International Encyclopedia of Rehabilitation

Copyright © 2010 by the Center for International Rehabilitation Research Information and Exchange (CIRRIE).

All rights reserved. No part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system without the prior written permission of the publisher, except as permitted under the United States Copyright Act of 1976.

Center for International Rehabilitation Research Information and Exchange (CIRRIE)
515 Kimball Tower
University at Buffalo, The State University of New York
Buffalo, NY 14214
E-mail: ub-cirrie@buffalo.edu
Web: http://cirrie.buffalo.edu

This publication of the Center for International Rehabilitation Research Information and Exchange is supported by funds received from the National Institute on Disability and Rehabilitation Research of the U.S. Department of Education under grant number H133A050008. The opinions contained in this publication are those of the authors and do not necessarily reflect those of CIRRIE or the Department of Education.

Attention-Deficit Hyperactivity Disorder (ADHD)

Luz Elvira Vallejo Echeverri
Neuropsychologist and assistant translator for Spanish at the *Laboratoire d'informatique et de terminologie de la réadaptation et de l'intégration sociale* (LITRIS)
http://www.irdpq.qc.ca/soutien_scientifique/litris.html
luz.vallejo@irdpq.qc.ca

Many comparative studies and analyses have been conducted about attention-deficit hyperactivity disorder around the world. Along with these, many discussions and controversies on the topic took place, especially in terms of aetiology and pertaining to the intervention methods used in the treatment of ADHD (Peña, and Montiel 2003).

Without each of these analyses and discussions, it would not be possible to scrutinize and refine professional therapies daily in order to improve the quality of life of patients and their families.

What is ADHD? Definition and Aetiology

Attention-deficit hyperactivity disorder is a neurobiological condition involving behavior dysfunctions and cognitive distortions. The onset of this condition typically occurs according to a common trend in children, affecting 5-8% of school-age children (Montañés, F. 2008), boys being three times more likely to show this impairment than girls (Puentes-Rozo, et al. 2008). However, these data may vary according to the methods used in studies and the population being studied

ADHD is a disorder that is not solely observed in children. In adults with ADHD, approximatively 60 % show symptoms of inattention, impulsiveness, irritability, intolerance, and frustration, the onset of which occurred before seven years of age. According to some Spanish studies, offending behaviors, alcohol abuse and other addictions, as well as difficulties in establishing close relationships and keeping a job can be observed in adults with ADHD (Valdizán, and Izagueri-Gracia 2009).

ADHD is a heterogenous syndrome with a mutlifactorial aetiology in which sex-specific roles, socialization processes, and assigned roles (Piaget, 1975) have an influence in every culture. Also, early access to new telecommunication technologies (television, video games, Internet, etc.) and the constant exposure of the population to numerous stimuli from the environment (acoustic, visual, gestural, etc.) that are beyond minimal control, that is to say without proper monitoring from parents, tutors, or teachers, make a significant difference.

It should be common knowledge that ADHD is a disorder affecting the central nervous system, in which 80% of the genetic and biological factors (Wender, 1971) are linked to the history of the cerebral development (decreased availability of neurotransmitters, such as norepinephrine and dopamine), familial history, and genetic predisposition to this type

of disorder in parents. This condition is most often transmitted to children when the father or both parents show similar symptomatology, whether these symptoms were diagnosed and treated or not, and according to the treatment received.

Other variables of some influence are related to the levels of the children's nutrition during their development process due to the impacts they have on the brain's chemistry.

Finally, it should be mentioned that environmental variables such as noisy houses, high levels of stress in parents—anxiety disorders, alcohol abuse, antisocial attitudes, personality disorders, and family violence, as well as and the high standards required by educators and schools that cause frustration in children trying to achieve these outcomes.

Causes and Clinical Manifestations of ADHD

Historically, ADHD was referred to as "hyperactivity" or "hyperkinesia" (Strauss et al., 1947; Fernandez and Calleja Pérez, 2007). It was renamed as "attention-deficit hyperactivity disorder" (ADHD) in 1994 and divided into three categories or sub-types: inattention, hyperactivity and impulsiveness. With the criteria provided in the DSM-IV-TR, a specific description of each sign and symptom is provided, as well as the criteria available in behavior scales for parents and teachers such as in the Conners' Rating Scales and the Behavior Assessment System for Children or BASC (Reynolds and Kamphaus. 1994). Different behavior traits and types are also observed in ADHD.

Children with ADHD act automatically, without control or thinking beforehand, and are unable to concentrate easily. They are generally able to understand instructions provided to them, but show difficulties in the performance of activities, in remaining seated, focusing their attention and attending to specific details included in the tasks assigned to them.

In fact, a differential diagnostic is necessary with anxious or 'hyperexcited' children, or those who are experiencing traumatic situations such as the divorce or separation of their parents or significant others, sudden changes in their lifestyle, etc.—especially at critical ages. The onset of ADHD's persistent symptoms in activities of daily living—school and family life, social relationships— is affecting their performance in each of these domains.

The multiple causes mentioned by ADHD experts suggest that the aetiology is multifactorial. Some brain areas are approximatively five to ten percent smaller in terms of size and activity level in children with ADHD. Moreover, significant changes in brain chemicals were observed in these studies.

While brain neurons "speak" to each other, different neurotransmitting substances establish synaptic connections through a system similar to the telephone. These neurotransmitters rely upon a specific network of grouped neurons that create real paths or anatomical systems. Each of these has its own function: memory and vigilance rely upon the cholinergic system; the motor system relies upon the dopaminergic system; and the noradrenergic system involves dreams, mood swings, as well as satisfaction and dissatisfaction feelings. It would appear that, in children with ADHD, all of these systems

are altered despite the diversity of cognitive impairments; yet, clinical research shows that frontal structures and central nucleus are the most affected areas of the brain (Barkley, 1998).

Clinical Criteria in the Diagnosis of ADHD

Clinical Manifestations of Cognitive Impairments

1. **Executive Function**: children with ADHD show difficulties in planning, organizing, and performing strategies.

2. **Attention Function:** inattention due to inability in paying attention to details, along with an increased number of careless mistakes committed out of negligence in several domains of daily living. Difficulties in sustaining attention while performing activities or games. Children show severe problems when they must follow through on instructions and tend to avoid tasks that require sustained mental effort. Moreover, they show an apparent trend in losing their personal belongings or forgetting their academic obligations.

3. **Memory Function**: often forgetful of daily duties, instructions, orders, and recommendations. Difficulties in recalling general information, even with intense effort.

4. **Perceptive Function**: obvious hearing impairments.

Clinical Manifestations of Motor Impairments

In most patients with ADHD, there is evidence of motor instability, which manifests itself in motor symptoms such as dyskinesia, instability, or body language indicating shyness.

- **Difficulty in remaining seated**: leaves seat in class or other places where staying seated is expected, such as during mealtimes or social gatherings; fidgets with hands, feet, or squirm in seat.

- **Difficulty awaiting turn or standing in line. Runs about or climbs excessively** when it is inappropriate.

- **Talks excessively**: blurts out answers before questions have been completed.

- **Tendency to interrupt:** interrupts or intrudes on others, such as butting into conversations or games.

- **Difficulty engaging in quiet activities**.

- **Feeling of always being "in a hurry"**.

Criteria that must be present for a boy or a girl to be diagnosed as hyperactive or impulsive:

- behaviors including the sub-types mentioned in the list of motor impairments (1-3) must occur before seven years old;

- these behaviors must be more intense than those observed in other children of the same age group;

- this type of behavior must last at least six months; and,

- these behaviors must be occurring and having negative impacts in at least two domains of the child's life (in several activities of daily living: at school, at home, in kindergarten, or in social relationships with peers or friends).

For a boy or a girl to be diagnosed as having ADHD-combined type, a variety of cognitive and motor criteria must be present, and for that matter, this is one of the most common types of ADHD diagnosis.

How is ADHD Identified?

The proper way to identify ADHD in children generally includes gathering detailed information from parents, teachers and tutors with whom young people spend much of their time. The clinician compiles this information from notes and cumulative records on behaviors. Moreover, parents, tutors and teachers are provided with behavior assessment scales allowing them to consider disruptive behaviors. For each case, observation and assessment protocols allow a more formal analysis of the children with ADHD's history of development (BASC for children and teenagers aged between 4 and 18 years old; C.R. Reynolds and R.W. Kamphaus 1994).

As mentioned above, diagnosing ADHD in the absence of all the required variables is an extremely sensitive matter (First, Michael B. et al. 1999, DSM-IV-R, differential diagnosis), including differential diagnoses of other conditions sharing a common diagnosis of comorbidity with this impairment (Kandesjo B, Gilberg C. 2001). For example, negative behaviors lead to learning disorders, such as dyslexia in 87% of cases, to affective disorders, such as depression in 18% of cases, as well as to anxiety present in 25% of cases. Other types of anxiety disorders may occur with ADHD, such as obsessive-compulsive disorders, Tourette's syndrome, as well as motor and vocal tics (Tomás M. 2008). ADHD rarely occurs in an isolated fashion (Kandesjo B., Gilbert C. 2001) as it typically appears along with another disorder. Therefore, the clinician in charge should refer the child to the appropriate expert when associated pathological conditions (medical, neuropsychological, psychiatric, etc.) are outside of his/her area of expertise.

It is also very important to take into account the persistent and inappropriate models of inattention and hyperactivity-impulsiveness in the diagnosis, as well as school, social, and familial dysfunctions, as previously mentioned.

In children less than 5-years-old showing signs and symptoms related to ADHD, assessments must be administered according to the child's developmental level. It is considered inappropriate to make closed diagnoses or to label the child permanently if he/she has not yet integrated the first level of school. Among others, factors associated with lack of maturity in sphincter control and personal care management must be considered. Behaviors towards work schedules established in far-reaching structured programs divided in thematic areas are also important to take into consideration.

Types of Intervention in ADHD

Multidisciplinary teams composed of physicians, psychiatrists, psychologists, educators, teachers, parents or tutors, neurologists, and neuropsychologists will always be an important part of the work. This type of team will provide tailored organization of long-term treatments through cognitive and behavioral therapies combined with medication. Moreover, it is important:

- to create awareness among parents, tutors, or teachers through training workshops on ADHD, and different educational intervention methods used in school and at home (Valett, 1981; Armstrong, 2001);

- to provide practical training to get accustomed to compiling specific information on children with ADHD's behaviors—assessment protocls or sclaes administered by clinicians, such as Conners' Rating Scales and the the Behavior Assessment System for Children or BASC (Reynolds and Kamphaus 1994).

- to establish routines using specific and timely information on ADHD in order to reduce stress resulting from the great amount of energy spent by parents and educators; and to improve function in children with ADHD (Caron, 2006).

- to improve symptoms of maladjustment in children with ADHD through problem-solving and emotional management training (Caron, 2006 p. 9); to increase the number of playful and sport activities; restructure the school and home atmosphere in which the child is developing—such as turning the television, radio, or computer off, especially in times when the child or teenager should be doing homework or sitting for meals—, and to develop programs, off-programme schedules of the children's activities and leisure time, and to enhance self-esteem, etc. (Lavigueur, 2002)

- to follow the American Academy of Pediatrics (AAP) recommendations according to which leaving young children aged 2 years old or less watching television, playing computer, or video games without any supervision is inappropriate. Children aged 2 years, or less, should be imposed daily limits of one or two hours of high-quality television programs under the supervision of adults.

- to use pharmacotherapy, but not as the sole solution for the treatment of children affected by this disorder. Several types of medication can be used to treat ADHD. Stimulants, non-stimulants, and antidepressants are sometimes used as options for treatment. Yet, they must be used under the supervision of a medical practitioner due to their side effects.

- to recognize that methylphenidate is the most commonly used medication in many cases (Barkley, 1997). This medication, widely known under its popular name Ritalin, is a chemical stimulant that intensifies the frontal; lobe's capacity, reduces physical and verbal activity, and helps in maintaining sustained attention. Moreover, it activates neuronal communication between the frontal and prefrontal lobes, and controls the amount of neurotransmitters carried by blood to cerebral structures 5hat penetrate into the brain up to the synapses. This is where some components of the drug attach themselves to neurotransmitters, facilitating the release of noradrenaline (NA), or norepinephrine, as well as dopamine (DA) (Lavigueur, 2002);

- that pharmacology professionals must inform, in a timely manner, parents and educators of the potential attendant risks of medication use, as drugs can be harmful to children and teenagers in several ways. Moreover, a child may react positively to a treatment, yet negatively to another. In order to select the best combination of drugs for the treatment of a given patient, professionals such as a general practitioner or a neurologist can suggest different drugs and dosage regimens, especially if the patient is already receiving treatment for ADHD or another disorder;

- to prevent ADHD onset in childhood in order to apply, re-organize and tailor short-term, mid-term, and long-term treatments;

- to assess therapy benefits and the learning models used.

Other Therapeutic Aspects of ADHD

Compilation of the entire patient's clinical history is required, including signs and symptoms, medical and familial history such as allergies, behaviors in school or home settings, individual strengths and weaknesses, as well as associated pathological conditions, etc.

Diagnosing ADHD is not considered as a therapeutic intervention leading to global rehabilitation. Actually, it is the first step of the rehabilitation process, but it is crucial in several cases, since the lack of specific diagnoses and appropriate therapies increase aversion to therapies, drop-outs, or inclination towards offending and irresponsible behaviors, such as addictions to toxic substances in teenagers and adults (Galves Flores, and Rincón Salazar 2008).

There is an urgent need to implement appropriate multidisciplinary treatments based upon the social, cultural, familial, and individual differences of patients with ADHD in order to

intervene and provide relevant information that will allow them to learn how to manage their symptoms efficiently.

There is also a need to organize work methods under the supervision, and with the help of parents and educators, providing feedback and a new assessment every 2, 4, or 6 months. If changes occurred during these steps, no neurological disorder is present; but if cognitive and motor impairments are persistent and no change is observed during control steps, significant neurological disorders are thereby confirmed.

Feedback must be addressed in simple terms to the patient with ADHD. At the same time, specific information must be provided to parents and educators in appropriate terms, by avoiding the use of stereotypes or to put the blame on anyone for the symptoms shown by patients with ADHD. The goal is to get parents and teachers' involvement in therapy in order to guide properly the rehabilitation process of the persons affected with this disorder. In most cases, these persons are unaware of their impairment, and their parents do not know the strategies to use in order to face the impairment of their children.

Clear instructions should be given and mechanisms implemented in order to give numerous strategies to avoid limiting the motivation process that is so important in rehabilitation. Children with ADHD should learn how to use appropriate strategies to control their disruptive behaviors through either combined techniques of cognitive and behavioral therapies, proper dosage regimens of medication for every specific case, and this, after making sure that any other associated condition has been eliminated.

It is also important to reinforce abilities in the management of personal hygiene during leisure time, as well as to use relaxation techniques, increase the number of playful and sport activities, implement balanced diets, and reduce the consumption of food increasing chemical imbalances in the brain that maintain ADHD symptoms—as this method actually works in some patients.

Conclusion

ADHD is frequently diagnosed in children and creates secondary disorders most likely to remain during adulthood. In clinical settings, seldom are the chances to find ADHD in an isolated pattern and comorbidity associated with neuropsychological disorders and impairments is most likely to appear. This is why interventions made by interdisciplinary and multidisciplinary teams are critical. These teams should:

- specify the clinical picture observed by using assessment, observation, and follow-up protocols of ADHD signs and symptoms;

- integrate a combination of efficient methods in the intervention for each case; involve patients in the achievement of their therapeutic goals based on their age, educational level, as well as their family, school, and social supports;

- create efficient and less punitive methods (create routines in daily habits, reduce stimuli causing distractions) by using a reinforcement system increasing

- constantly make adjustments throughout treatments. These are relevant for each step of the rehabilitation process and for each patient during their integration to daily life;

- support the establishment of a support network for families with children or teenagers with ADHD in order to build support between expert families, professionals and institutions, as well as between local, national, and international communities. This network will help in identifying and establishing awareness mechanisms on the importance of appropriate therapeutic interventions for patients with ADHD. It will also allow prognoses that are more positive for affected populations. Moreover, this network will help eradicating feelings of anxiety associated with the disorder and thus enhance the quality of life of the population with ADHD.

Below are some internet sites with useful information about ADHD.

- Document de soutien à la formation - Trouble de déficit de l'attention/hyperactivité - Agir ensemble pour mieux soutenir les jeunes [Site éditeur Ministère de la Santé et des Services sociaux [québécois]

- http://www.associationpanda.qc.ca/

- http://www.psiquiatria.org.co/BancoConocimiento/H/historia/historia.asp?CodIdioma=ESP

- http://www.chu-sainte-justine.org/famille/CISE-description.aspx?id_sujet=100112&ID_Menu=668&ItemID=2a&id_page=1454&refv=TDAH

- www.psiquiatria.com

- American Academy of Pediatrics. Clinical Practice Guidelines: http://aappolicy.aappublications.org/cgi/reprint/pediatrics;105/5/1158.pdf

References

ADHD and their family members in 2000. 2005. Medical Research Opinion 21:195-206.

American Academy of Pediatrics. 2000. Clinical practice guideline: diagnosis and evaluation of the child with attention-deficit/hyperactivity disorder. Pediatrics 105:1158-1170.

Armstrong T. 2001. Síndrome de Déficit de Atención con o sin Hiperactividad ADD/ADHD. Estratégias en el aula. Argentina: Paidós.

Barkley R. 1998. Attention Deficit Hyperactivity Disorder: A Handbook for Diagnosis and Treatment. New York: Guilford.

Barkley R. 1997. ADHD and the nature of self-control. New York: Guilford.

Barkley R. 1998. Attention deficit hyperactivity Disorder: A handbook for diagnosis and treatment. New York: Guilford.

Caron A. 2006. Aider son enfant à gérer l'impulsivité et l'attention. Ed. Chenelière Éducation. Canada.

Fernandez-Jaén A, Calleja-Pérez B. 2000. Trastorno de déficit de atención con hiperactividad hipomelanosis de Ito. Revista de Neurologia. 31:S680-681.

First MB, et al. 1999. DSM-IV-R, diagnostique différentiel. Barcelona. p. 124.

Galves Flores JF, Rincón Salazar DA. 2008. Manejo clínico de pacientes con diagnostico dual. Evaluación diagnóstica de los pacientes fármaco dependientes que sufren de comorbilidad siquiátrica. Revista Colombiana de psiquiatría 37(3).

Lavigueur S. 2002. « Ces parents à bout de souffle; Un guide de survie ». Les éditions Quebecor. « Une entrevue avec le docteur Claude Desjardins, pédiatre ». Outremont (Québec). p. 231 et suivantes, 379 et suivantes.

Montañés F. 2008. Sobre el Trastorno por Déficit de Atención con Hiperactividad (TDAH): Algunos creen que hay que elegir entre fármacos o psicoterapia, cuando lo normal es combinarlos. Diario médico, Febrero-2008. (Psiquiatrìa.com)

Peña JA, Montiel Nava C. 2003. Trastorno por déficit de atención/hiperactividad: ¿mito o realidad? Revista de Neurologia 36:173-179.

Piaget J. 1975. À propos de la notion de moitié : Rôle du contexte expérimental. Archives de psychologie 53:433-438.

Puentes-Rozo PJ, Barceló-Martinez E, et al. 2008. «Características conductuales y neuropsicológicas de niños de ambos sexos, de 6 a 11 años, con trastornos por déficit de atención/hiperactividad ». Revista de Neurologia 47(4):175-184.

Reynolds CR, Kamphaus RW. 1994. Behavior Assement System for Children. Georgia: EEUU.

Strauss AA, et al. 1947. Psychopathology and education of the brain-injured chid. New York: Grune and Stratton.

Tomás M. 2008. «Alteraciones del sueño», Anales de Pediatría. 69:251-257.

Valdizán JR, Izagueri-Gracia AC. 2009. Trastornos por déficit de atención/hiperactividad en adultos. Revista de Neurologia 48:95-99.

Valett ER. 1981. Niños hiperactivos; guía para la familia y la escuela. Ed. Cincel-Kapelusz. Barcelona.

Wender P. 1971. Minimal Brain Dysfunction in Children. New York: John Wilry and Sons, Inc.