Child Psychiatry Hum Dev (2008) 39:311–322
DOI 10.1007/s10578-007-0090-5

ORIGINAL PAPER

Prevalence Rates of Attention Deficit/Hyperactivity Disorder in a School Sample of Venezuelan Children

Cecilia Montiel · Joaquín A. Peña · Isabel Montiel-Barbero · Guilherme Polanczyk

Published online: 22 December 2007

Abstract A total of 1,535 4–12 year-old children were screened with the Conners' rating scales, followed by diagnostic confirmation by the diagnostic interview schedule for children-IV-parent version. The prevalence of ADHD was estimated to be 10.03%, and only 3.9% of children had received medication for the treatment of ADHD symptoms. Prevalence rates and demographic profile of Venezuelan children with ADHD are very similar to those found in samples from other countries. Authorities need to develop public health policies to correctly identify and treat affected subjects. Furthermore, clinicians must actively search for children with ADHD in order to provide the best-available treatment.

Keywords ADHD · Prevalence · Epidemiology · Venezuela · Latin America · Culture

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is characterized by impairing and pervasive symptoms of inattention, hyperactivity, and impulsivity with onset during childhood

C. Montiel (✉) · I. Montiel-Barbero
Psychology Department, La Universidad del Zulia, Calle 79 No. 3E-31, Maracaibo, Estedo Zulia, Venezuela
e-mails: ceciliamontiel@cantv.net; ceciliamontiel@gmail.com

J. A. Peña
Graduate Program of Pediatric Neurology, School of Medicine, La Universidad del Zulia, Urbanización La Trinidad, Hospital Clinico, Maracaibo, Venezuela
e-mail: juaco949@hotmail.com

I. Montiel-Barbero
e-mail: barbero@iamnet.com

G. Polanczyk
ADHD Program, Hospital de Clinicas de Porto Alegre, Federal University of Rio Grande do Sul, Rua Ramiro Barcelos, Porto Alegre, RS 2350, Brazil
E-mail: guilherme.polanczyk@terra.com.br

that persist in about a third of patients across the life-span [1]. Since Still [2] made the first description of a group of 20 children with different degrees of aggression, hostility, defiant behavior, and hyperactivity, there have been several attempts to conceptualize a syndrome which might group those symptoms. Early in the history of this disorder it was thought that the core symptom was the excess of activity; later, it was considered as a companion factor for the deficits in attention. Recently, DSM-IV-TR [3] considers ADHD as a syndrome with two dimensions: attention deficit and hyperactivity-impulsivity, dimensions that have been confirmed through factorial analysis studies [4].

Few nosological entities in child and adolescent psychopathology exhibit such a broad range of prevalence estimates as ADHD [5]. Some authors argue that variability is a function of cultural and demographic diversity, with higher rates presented in North America than in other parts of the world [6]. However, a recent study indicates that the wide variability of prevalence rates is mainly dependent of differences in the methodology used across studies [7].

Although there have been reports about the stability of the disorder across different countries and similar proportions of children considered as deviant [8], there is confusion in the definitions of impulsivity, hyperactivity, and distraction among clinicians from different cultures [9]. Thereby, it is of relevance to explore whether psychiatric taxonomies developed in one part of the world are useful in classifying mental disorders in other countries, and how consistent illness expression is among countries [10, 11]. The variability in ADHD prevalence rates reported in different cultures could be a reflection of the differences in social tolerance of the behaviors encompassed by ADHD [12]. Culture represents one of the most powerful influences in the development of a normal or problematic child, since expectations and patterns related to performance and appropriate behavior vary depending on the country where the child is raised. Souza et al. [13] suggest that since cultural factors may modulate the clinical manifestations of disruptive behavior disorders, a strong test of the construct validity of ADHD profile is its replication in different cultures.

Most Latin-American countries (with the exception of Brazil, Colombia, and Puerto Rico), lack the epidemiological indicators of child psychopathology. This scarcity of information has as direct consequences the absence or inadequacy of diagnostic and therapeutic services for children with ADHD. Venezuela is the sixth largest country of Latin America, with a total population of approximately 260,000,000 people, of which about 33.1% are younger than 14 years old [14]. Preliminary findings of the ADHD Venezuelan Epidemiological study which assessed 1,141 children aged 6–12 years, reported an estimated prevalence of ADHD of 7.19%. However, these data were based solely on the scores from rating scales [15].

Diagnostic and treatment services for children with ADHD are still in great need of development in many countries, and Venezuela is not the exception. Therefore, health and education authorities need to have more precise information about the extent of the problem to provide adequate services for these children. In our country, as in most Latin-American countries, the lack of information regarding the number and characteristics of children diagnosed with ADHD hinders the planning and development of appropriate health and educational programs for this population. In addition, results from this study will guide clinicians and researchers in understanding the behavior of this understudied population of Latino children, which will also offer help in planning services for latino children living in non-latino countries. Thus, the main objective of this study was to provide up-to-date estimates of the prevalence of ADHD in Venezuela, and to assess demographic and clinical characteristics of these children using standardized measures and the most recent diagnostic system.

Method

Setting

This study was carried out in Maracaibo county, which is part of the greater city of Maracaibo. Maracaibo, the second largest city of the country, has approximately 2,200,000 people, constituting the 12% of Venezuelan population. It is located in the western part of the country, very close to the Colombian border. Maracaibo county encompasses more than half of the state's population (approximately 1,220,000 people). The county is divided in 18 school districts, and at the time of the study, it had a total of 146,983 registered 4–12 years old children.

Sampling Process

The study was a three-stage, two phase, cross-sectional survey with stratification by type of school. The three stages were (a) random sampling of the school districts, followed by (b) random sampling of schools (stratified into high private urban schools, medium private urban schools, low private urban, and public urban schools), and (c) a random sampling of one class per grade from each selected school, with the inclusion of all children from each classroom. The two phases included screening and diagnostic confirmation.

Initial power calculations using the EpInfo program [16] indicated that a sample of 1,081 children would be needed to obtain the estimates of prevalence for ADHD in our population. Such calculations were based on a measure of precision of 1%, an alpha error of 1% and a total number of registered students of approximately 146,900. It was also assumed an ADHD prevalence between 3% and 8% for the targeted age group (4–12). This prevalence was calculated on the basis of a pilot study in our city that showed an ADHD prevalence of 7.19% in children aged 6–12 years [15]. The three school districts selected had 258 schools (31% of the total schools in the county). One hundred and fifty-nine schools were randomly selected, which corresponded to 61% of the schools in the districts, and 19% of the schools in the county (159 of 849).

A total of 1,750 children were randomly selected from the school registers, of which 99 were not suitable due to errors in the school list or refusal of participating in the study. Of the remaining 1,651 suitable children, the parents of 1,640 could be contacted and gave their consent and it was later possible to collect parent and teacher rating scales on 1,535 children (representing 88% of the 1,750 originally selected).

The participation rate did not vary significantly by type of school, being 60% from public schools (87 of 147), and 72% from private schools (72 of 111). The mean age of the total sample was 8.81 years (SD 1.81), and boys made up 55.95% of the total sample (859 of 1,535). This sample constitutes a sampling fraction of approximately 1.04 per 100 children in the population. The distribution by age and sex of the sample obtained was similar to that of the Maracaibo population as described in the 2001 Venezuelan census [14].

First Phase: Screening Procedures

The screening instrument was the Spanish version of the Conners' parent rating scale—Revised (CPRS-R) and the teacher rating scale—Revised (CTRS-R) in their long version

[17]. Both versions of the CRS-R (parent and teacher) were translated into Spanish and then independently back translated to check for fidelity. A pilot study using these Spanish versions was carried out in Venezuela to establish norms of the CRS-R for Venezuelan children. The results showed an internal consistency measured by Cronbach's alpha of $\alpha = 0.94$ for the parent version, and $\alpha = 0.95$ for that of teachers [18]. Several reports have established the CRS-R as a sensitive and specific screening tool for ADHD [19, 20].

A letter describing the study was sent to the parents of all selected subjects along with an informed consent form. The parents who responded affirmatively received an envelope with the rating scales (CPRS-R) with a request to complete them. At the same time the teachers of the children whose parents agreed in participating completed the rating scales (CTRS-R). Children who obtained T scores of or above 70T (2SD above the mean) in either parent or teacher's rating scales were considered as possible cases (screens positive) and were scheduled for a diagnostic assessment. Furthermore, a random sample of screens negative (T scores of or below 65T according to parents and teachers) was also selected for further evaluation.

The assessment and research protocols were approved by the psychology department of La Universidad del Zulia.

Second Phase: Diagnostic Procedures

The diagnostic evaluation was composed by a structured diagnostic interview, IQ assessment, and a developmental history. All participants received identical assessment. The diagnostic interview schedule for children-IV-parent version [DISC-IV-P] was applied for the diagnosis of ADHD according to DSM-IV criteria [21]. This interview was administered to the parents by licensed and trained psychologists. Interviews were videotaped and 15% were spot checked for quality control. The test–retest reliability of the DISC-IV has been reported in both Spanish speaking and English speaking samples, yielding similar results [21–23]. The IQ was estimated based on the vocabulary and block design subtests from the WISC-III [24] for children aged 6–12 years, and similarities and information subtests from the WPPSI-R [25], for the children between 4 and 5 years old.

The adaptive functioning of children was evaluated with the children's global assessment scale (CGAS). The CGAS is a widely used measure for child and adolescent global functioning with appropriate psychometric properties [26]. It is a scale from 0 to 100, the higher the score the better the global functioning [27]. This scale was translated to Spanish and has been used in other studies with Venezuelan children [28]. For this study, as it has been done in many other studies [27], a score of 70 was the cut point for a case. Any child with a score below 61 was considered as a definite case, a child with scores between 61 and 70 a possible case. Researchers who administered the C-GAS were blinded to the diagnostic categories of the children (ADHD, non-ADHD).

The school type (private and public) was used as an indicator of the socioeconomic status (SES) using the following criteria: public schools (totally free), and schools with fees that were equal or lower to the 20% of the monthly minimal salary at the time of the study were considered as level I or Low SES. Schools with fees between 21% and 40% of the monthly minimal salary at the time of the study were considered as level II or medium SES; and level III or high SES was assigned to the schools with fees above the 41% of the monthly minimal salary at the time of the study. Children in the ADHD group met the following inclusion criteria: (1) diagnostic criteria for DSM-IV ADHD according to the parent's DISC-IV, (2) onset of symptoms before the age of 7 years, (3) CGAS < 71. The

non-ADHD group did not meet diagnostic criteria for ADHD according to the parent's DISC-P. Exclusion criteria for both groups were as follows: (1) presence of any pervasive developmental disorder, schizophrenia, or psychotic disorder and, (2) presence of gross or motor abnormalities.

The goal during the second stage was to clinically evaluate all the children who screened positive, as well as a random sample of those who screened negative. With data on all the positives and on a proportion of the negatives, prevalence rates were calculated by adjusting for this sampling procedure.

Statistical Analyses

Group comparisons (ADHD versus non-ADHD; and subtypes) were conducted using chi-square tests for categorical variables (gender, use of medication) and analysis of covariance (ANCOVA) for continuous variables (age, IQ, CPRS, CTRS, CGAS). Since multiple comparisons were performed, a significance level of 0.01 was used to reduce the possibility of type I error. The ADHD prevalence was estimated using a procedure that included the number of cases detected at the diagnostic phase, the number of screening negatives, the negative predictive value of the screening test and the sample size [29]. Prevalence rates were calculated on the basis of the total number of children assessed.

Results

From the 1,535 children, 175 had a positive screening at the first stage and were compared to a randomly selected sample of 75 children with a negative screening. We could not complete the assessment of 17 children (6.8%) because the parents did not attend to the scheduled assessment sessions and the contact with them was lost. The ADHD prevalence in the sample is 10.03 (95% CI 7.9–13.03). The analyses of the associations between the screening process (Conners' rating scales) and the structured diagnostic interview results (DISC-IV-P) revealed that Conners' rating scales have both high sensitivity (92.21%) and specificity (71%).

Comparisons were made between children with (n = 154) and without (n = 79) DSM-IV diagnosis of ADHD. There were significant differences in the gender distribution between both diagnostic groups as the ADHD group had a higher proportion of males (χ^2 = 11.264, df = 1; $P < 0.01$). However; age, SES, grade retention, and IQ were equivalent for both groups (Table 1). Children with ADHD presented poorer adaptive functioning than controls, reflected by the lower C-GAS scores (F = 39.687; df = 1; $P < 0.001$). Upon dividing children with ADHD according to the different impairment criteria, we found that 6.45% (n = 99) of the children had C-GAS scores below 60, and 3.58% (n = 55) scored between 61 and 70.

The analysis of the demographic data of the 154 ADHD cases identified yielded that, as expected the male prevalence was higher than the female, being the proportion among genders of 3:1. From the total sample of ADHD children, 117 were males which corresponded to a prevalence of 7.62% and 37 were females which translates into a prevalence of 2.41%. As it is displayed in Table 1, the number of cases was higher for the lower SES, with a prevalence of 7.17% for the low SES, and 1.43% for both the medium and high SES (χ^2 = 0.853; df = 2; P = 0.653).

Table 1 Comparison of clinical and demographic characteristics of children with ADHD versus controls

	ADHD sample n = 154	Non-ADHD n = 79	F	χ^2	P
Gender				11.264	<0.010
No. male (%)	117 (76)	43 (54.4)			
No. female (%)	37 (24)	36 (45.6)			
Age	7.73 ± 1.94	7.89 ± 1.97	0.319		NS
SES				0.853	NS
No. low SES (%)	110 (71.4)	60 (75.9)			
No. medium SES (%)	22 (14.3)	11 (13.9)			
No. high SES (%)	22 (14.3)	8 (10.1)			
IQ	82.66 ± 18.26	80.03 ± 20.58	0.993		NS
CGAS	63.48 ± 10.18	74.49 ± 16.41	36.687		<0.010

No: number of patients; SES: socio economic status; C-GAS: children's global assessment scale; SD: standard deviation

Among the 154 ADHD cases, 96 (63%) were of the combined subtype, 13 (8%) were of the predominantly inattentive subtype, and 45 (29%) were of the predominantly hyperactive-impulsive subtype. The comparison among subtypes revealed a similar distribution of the subtypes across genders ($\chi^2 = 0.582$; df = 2; $P = 0.807$). On the other hand, there was a significant difference of age among subtypes, as the predominantly hyperactive-impulsive subtype was that of the youngest children ($F = 7.305$, df = 2; $P < 0.01$). There was also a significant difference on the adaptive functioning among subtypes with the predominantly hyperactive-impulsive exhibiting the lowest C-GAS scores ($F = 7.305$; $P < 0.01$). Regarding the degree of impairment, there was a significant relationship between subtypes and C-GAS scores ($\chi^2 = 14.035$, df = 2, $P = 0.001$), with most of the children of the hyperactive-impulsive subtype scoring below 60. The subtypes did not differ on IQ scores, grade retention, or previous use of stimulant medication (Table 2).

Grade retentions were present in 7.8% (n = 12) of the ADHD children and only 3.9% (n = 6) of children had received stimulant medication for the treatment of ADHD symptoms. None of the children from the inattentive group had received stimulant medication at

Table 2 Subtypes characteristics

	Combined (n = 96)	Inattentive (n = 13)	Hyperactive-impulsive (n = 45)	F	χ^2	P
Age—mean (SD)	8.20 (1.87)	8.15 (1.57)	6.60 (1.75)	12.3		<0.001
Gender					0.428	NS
Male—n (%)	72 (75)	10 (79.92)	36 (80)			
Female—n (%)	24 (25)	3 (23.08)	9 (20)			
IQ—mean (SD)	84.15 (19.75)	80.00 (14.88)	80.64 (15.44)	0.73		NS
C-GAS—mean (SD)	65.35 (11.18)	65.46 (10.62)	58.80 (4.69)	7.31		0.001
Stimulant medication—n (%)	4 (4.16)	0 (0)	2 (4.44)		1.008	NS

IQ: intelligence quotient; C-GAS: children's global assessment scale

Note: for gender, and stimulant medication, the number in the parenthesis refers to the percentage value. For age, IQ and C-GAS, the number refers to standard deviation

the time of the study. There were no differences between cases and no-cases regarding grade retentions and medication.

The analysis of cases depending on the source of information (parents/teachers) indicated slight discrepancies in the identification of children with ADHD: 42% ($n = 65$) corresponded to the cases identified only by the parent's responses, 35% of the children ($n = 54$) were identified by teacher's responses, and only 23% ($n = 35$) were identified by both parent and teacher's reports.

Discussion

In a sample of Venezuelan pre-school and school children, the prevalence rates of ADHD were similar to those reported in other countries [30, 31]. The DSM-IV-TR [3] indicates that ADHD prevalence ranges from 3% to 5%; however, studies using these diagnostic criteria report rates close to 17%[30–33]. Our prevalence of 10.03% is closer to the APA reports and to the studies using the DSM-III-R criteria [31, 34–36], but it is important to take into account that clinical impairment was included in the case definition. This prevalence rate is also similar to the 7.19% found in the preliminary findings of the ADHD Venezuelan epidemiological study which used rating scales [15]. The frequency of ADHD subtypes found in this study displayed a different distribution compared to the most recent studies which reported the combined subtype as the most common, and the hyperactive-impulsive subtype as the least common [37]. In our results, the most common subtype was also the combined; but the least common was the inattentive, a distribution also described in other studies [38, 39]. It is very interesting to mention that for the inattentive subtype, none of the children were receiving medication at the time of the study. The children from the predominantly hyperactive-impulsive group were younger and more impaired, probably because hyperactivity and impulsivity have been related to behavioral problems, while inattention was linked to academic difficulties [38, 40–42]. In a longitudinal study, Lahey et al. [43] found that children of the hyperactive-impulsive subtype were likely to shift to a different subtype over time, most of them migrating to the combine subtype later. Since our sample was mostly composed by children under 8 years of age (71%), age might have had an impact on the distribution of the subtypes.

Male sex, low socioeconomic status and young age have been associated with a higher prevalence of ADHD [1, 44, 45]. As it was expected males were overrepresented. The greater number of males than females has been one of the most consistent findings in the ADHD literature, ranging from 2:1 to 10:1 males per female [40, 46–48]. In Maracaibo county, the ratio was within this range of three males for each female. However, the male–female proportion was lower than those previously reported in epidemiological studies. Gallucci et al. [34] found a 7:1 ratio in an Italian sample; while in a meta-analysis Gaub and Carlson [48] reported 4:1. Pineda et al. [32] estimated that the ratio was 3:1 in a sample of Colombian children. As extensively described for samples in other countries, the preponderance of males was also confirmed in this sample from Venezuela.

Low SES is also considered as a risk factor for mental and medical problems, and it has been reported in some ADHD studies [49–51]. The higher prevalence for the low SES (7.17%) in our sample could be related to the fact that the majority of the Venezuelan population belongs to the low SES [14, 52]. As in other countries, in Venezuela low SES is related to restricted access to health services during pregnancy, birth related difficulties (deliveries taking place at home), poor nutrition during the infancy period, and educational

deficits. All of these are factors that might have influenced the prevalence rates across the different SES.

In Latin cultures, behavior problems are usually attributed to poor parenting skills, thus parents might take longer to reach for professional help and to consider medication as therapeutic options [53]. As we already mentioned, the low SES might also be related to reduced availability of therapeutic services, including less access to medication.

The analysis of cases depending on the source of information (parents/teachers), exhibited that parents perceived the children as more impaired and with more symptoms than teachers. Some studies show that the prevalence reported by parents tends to be higher than the teachers' [18, 54–56]. The differences in the ratings of the children depending on the source of information do not necessarily imply that one might be better than the other. It could be interpreted as a reflection of behavior fluctuations caused by diverse contexts or differential interactions among the child and the person who makes the report. Despite the disagreement among informants, each perspective is a valid contribution to a complete assessment of the children [55–57]. These preliminary findings need more clarification in order to have a better understanding of the role of each rater in the diagnosis of ADHD in children. Although the use of both parents and teachers reports for the diagnosis of ADHD in children enhances the certainty with which these assessments can be made [58], whether teachers or parents' ratings are more accurate is yet to be determined.

This study must be understood in the context of some limitations. The information provided from the educational bureau was the only source used for the estimation of the prevalence of ADHD leaving out children who did not attend any school at the time of the study. Although we used parent and teacher ratings scales as screening instruments, for diagnostic confirmation we relied solely on parents reports. Children from only one region of the country were recruited. However, the demographic characteristics of the children in this study are similar to those found for this age group in the last Venezuelan census for the western region of the country [14].

Children were carefully screened from the perspective of two different informants (parent and teacher) and clinically evaluated through a standardized diagnostic interview. This methodological strategy has the potential to identify children in need of treatment. An ADHD prevalence rate of 10.03% among 4–12 year-old children in Maracaibo, Venezuela must be considered as an alert signal for health and education authorities regarding the need of making notice and re-assess the scope of services available for children with this disorder and their families. Additionally, the very low rates of children on medication (3.89%), and the fact that none of the children from the inattentive subtype was receiving medication are strong indicators of the absence of knowledge and recognition of ADHD in Venezuela. Different data and prevalence ratios might be expected for different scenarios and countries. However, such differences might be considered as a function of the diagnostic system, assessment methods, and other differences in the methodology of gathering data, and not as exclusive manifestations of cultural differences [7, 59]. The results of this study might contribute to the literature of ADHD and child psychiatry in terms of suggesting that diagnostic criteria developed in one part of the world could be useful in making diagnostic judgments in other cultures. Additionally, it highlights the fact that children with ADHD in some cultures may be relatively under-treated compared to treatment patterns in other countries.

The prevalence rate of ADHD among pre-school and school-age children in Venezuela and demographic profiles of affected youths in our sample are similar to results of studies conducted in developed and in development countries [59]. The sampled population is representative of private and public schools across the country, which represents that

around 800,000 Venezuelan children aged 4–12 years are affected with ADHD. Even though theses are estimates, this study constitutes a good starting point not only for ADHD recognition in Venezuelan children, but also for the design and development of adequate treatment services for these children. Results indicate that Venezuelan children with ADHD are under-treated. This is a disorder with a heavy impact on the daily adaptive functioning at home, at school, and at leisure time that is associated with comorbid disorders (e.g., conduct disorder, ODD, substance use, mood disorders), poor academic and personal adaptative functioning during childhood and across the life-span, specially if not treated [59] Health authorities from Venezuela and from other Latin-America countries need to develop public health policies to correctly identify and treat affected subjects. Furthermore, clinicians must actively search for children with ADHD in order to provide the best-available treatment.

Summary

The main objective of this study was to provide up-to-date estimates of the attention deficit/hyperactivity disorder (ADHD) prevalence in a sample of 4–12 year-old Venezuelan children, and to assess demographic and clinical characteristics of these children using standardized measures and the most recent diagnostic system. Random sampling of the school districts was followed by random sampling of the schools, and of one class per grade. Children were screened with the Conners' parent and teacher rating scales, followed by diagnostic confirmation with the diagnostic interview schedule for children-IV-parent version (DISC-IV-P). The study was conducted from January 2002 to December 2003. A total of 1,535 children were screened, 175 had a positive screening and were compared to a randomly selected sample of 75 children with a negative screening. The prevalence of ADHD was estimated to be 10.03% (95% confidence interval = 7.9–13.03%). Male prevalence was higher (male:female = 3:1). Sixty-three percent of the ADHD cases were of the combined subtype, 8% were of the predominantly inattentive subtype, and 29% were of the predominantly hyperactive-impulsive subtype. The predominantly hyperactive-impulsive group was the youngest and most impaired ($P = 0.001$). Only 3.9% of children had received medication for the treatment of ADHD symptoms. Prevalence rates and demographic profile of Venezuelan children with ADHD are very similar to those found in samples from other countries. However, the low rate of children receiving treatment for ADHD indicates under identification of this condition. To provide adequate services for children with ADHD, health and education authorities need to have more precise information about the extent of the problem and clinicians must actively identify affected children. This study is an useful contribution to the literature in terms of suggesting that diagnostic criteria developed in one part of the world could be useful in making diagnostic judgments in other cultures. Additionally, it highlights the fact that children with ADHD in some cultures may be relatively under-treated compared to treatment patterns in other countries.

References

1. Biederman J, Faraone SV (2005) Attention-deficit hyperactivity disorder. Lancet 366(9481):237–248
2. Still G (1902) Some abnormal psychical conditions in children. Lancet 1:1008–1012
3. American Psychiatric Association (2000) Diagnostic and statistical manual of mental disorders, 4th edn. Text revision, American Psychiatric Association, Washington, DC

4. Lahey BB, Pelham WE, Stein MA et al (1998) Validity of DSM-IV attention-deficit/hyperactivity disorder for younger children. J Am Acad Child Adolesc Psychiatry 37(7):695–702
5. Faraone SV, Sergeant J, Gillberg C, Biederman J (2003) The worldwide prevalence of ADHD: is it an American condition? World Psychiatry 2(2):104–113
6. Timimi S (2005) Effect of globalisation on children's mental health. BMJ 331(7507):37–39
7. Polanczyk G, Lima MS, Horta BL et al (2007) The worldwide prevalence of attention-deficit/hyperactivity disorder. A systematic review and metaregression analysis. Am J Psychiatry 164(6):942–948
8. Dwivedi KN, Banhatti RG (2005) Attention deficit/hyperactivity disorder and ethnicity. Arch Dis Child 90(Suppl 1):i10–i12
9. Narbona J (2001) Alta prevalencia del TDAH: ¿niños trastornados, o sociedad maltrecha? Rev Neurol 32(3):229–231
10. Helzer JE, Canino G (1989) The implications of cross-national research for diagnostic validity. In: Robins LN, Barrett JE (eds) The validity of psychiatric diagnosis. Raven Press Ltd., New York
11. Rohde LA, Szobot C, Polanczyk G, Schmitz M, Martins S, Tramontina S (2005) Attention-deficit/hyperactivity disorder in a diverse culture: do research and clinical findings support the notion of a cultural construct for the disorder? Biol Psychiatry 57(11):1436–1441
12. Bird HR (1996) Epidemiology of childhood disorders in a cross-cultural context. J Child Psychol Psychiatry 37(1):35–49
13. Souza I, Pinheiro MA, Denardin D, Mattos P, Rohde LA (2004) Attention-deficit/hyperactivity disorder and comorbidity in Brazil: comparisons between two referred samples. Eur Child Adolesc Psychiatry 13(4):243–248
14. Instituto Nacional de Estadística (2004) Reporte Sociodemográfico. Censo de Población y Vivienda 2001. República Bolivariana de Venezuela. Cuadernos del Instituto Nacional de Estadística, Caracas-Venezuela
15. Montiel-Nava C, Peña JA, López M et al (2002) Estimados de la Prevalencia del Trastorno por Déficit de Atención-Hiperactividad en niños marabinos. Rev Neurol 35(11):1019–1024
16. Center for Disease Control and Prevention, World Health Organization (1996) Epi Info-Version 6
17. Conners K (1997) Conners' rating scales-Revised. Technical manual. Multi-health system, Inc., New York
18. Montiel-Nava C, Peña JA (2001) Discrepancia entre padres y profesores en la evaluación de problemas de conducta y académicos en niños y adolescents. Rev Neurol 32(6):506–511
19. Conners CK, Sitarenios G, Parker JD, Epstein JN (1998) Revision and restandardization of the Conners teacher rating scale (CTRS-R): factor structure, reliability, and criterion validity. J Abnorm Child Psycho 26(4):279–291
20. Ortiz-Luna JA, Acle-Tomasini G (2006) Differences in the way parents and teachers identify the symptoms of attention deficit hyperactivity disorder in Mexican children. Rev Neuro; 1–15;42(1):17–21
21. Shaffer D, Fisher P, Lucas C, Dulcan MK, Schwab-Stone M (2000) Diagnostic interview schedule for children version IV (NIMH DISC-IV): description, differences from previous versions and reliability of some common diagnoses. J Am Acad Child Adolesc Psychiatry 39(1):28–38
22. Bravo M, Ribera J, Rubio-Stipec M et al (2001) Test–retest reliability of the Spanish version of the diagnostic interview schedule for children (DISC-IV). J Abnorm Child Psychol 29(5):433–444
23. Canino G, Shrout PE, Rubio-Stipec M et al (2004) The DSM-IV rates of child and adolescent disorders in Puerto Rico: prevalence, correlates, service use, and the effects of impairment. Arch Gen Psychiatry 61(1):85–93
24. Wechsler D (1991) WISC-III. Wechsler inteligence scale for children—Third edition. Manual. The Psychological Corporation, Harcourt Brace & Company, San Antonio, Texas
25. Wechsler D (1989) WPPSI-R. Wechsler preschool and primary scale of intelligence—revised. Manual. The Psychological Corporation, Harcourt Brace & Company, San Antonio, Texas
26. Shaffer D, Gould M, Brasic J et al (1983) A children's global assessment scale (CGAS). Arch Gen Psychiatry 40:1228–1231
27. Bird H (1999) The assessment of functional impairment. In: Shaffer D, Lucas C, Richters J (eds) Diagnostic assessment in child and adolescent psychopathology. The Guilford Press, New York
28. Montiel-Nava C, Peña JA, Montiel-Barbero I (2003) Datos Epidemiológicos del Trastorno por Déficit de Atención-Hiperactividad en una muestra niños marabinos. Revista de Neurología 37(9):815–819
29. Rohde LA, Biederman J, Busnello EA et al (1999) ADHD in a school sample of Brazilian adolescents: a study of prevalence, comorbid conditions, and impairments. J Am Acad Child Adolesc Psychiatry 38(6):716–722
30. Baumgaertel A, Wolraich M, Dietrich M (1995) Comparison of diagnostic criteria for ADHD in a German elementary school sample. J Am Acad Child Adolesc Psychiatry 34:629–638

31. Verhulst FC, van der Ende J, Ferdinand RF, Kasius MC (1997) Prevalence of DSM-III-R diagnoses in a national sample of Dutch adolescents. Arch Gen Psychiatry 54(4):329–336
32. Pineda DA, Lopera F, Henao G, Palacio JD, Castellanos FX, Grupo de Investigación Fundema (2001) Confirmación de la alta prevalencia del trastorno por déficit de atención en una comunidad colombiana. Rev Neurol 32(3):217–222
33. Wolraich M, Hannah J, Pinnock T, Baumgaertel A, Brown J (1996) Comparison of diagnostic criteria for attention-deficit hyperactivity disorder in a county-wide sample. J Am Acad Child Adolesc Psychiatry 35:319–324
34. Gallucci F, Bird H, Berardi C, Gallai V, Pfanner P, Weinberg A (1993) Symptoms of attention-deficit hyperactivity disorder in an Italian school sample: findings of a pilot study. J Am Acad Child Adolesc Psychiatry 32(5):1051–1058
35. Leung PW, Luk SL, Ho TP, Taylor E, Mak F, Bacon-Shone J (1996) The diagnosis and prevalence of hyperactivity in Chinese schoolboys. Br J Psychiatry 168(4):486–496
36. Pelham WE Jr, Gnagy EM, Greenslade KE, Milich R (1992) Teacher ratings of DSM-III-R symptoms for the disruptive behavior disorders. J Am Acad Child Adolesc Psychiatry 31(2):210–218
37. Biederman J, Mick E, Faraone SV et al (2002) Influence of gender on attention deficit hyperactivity disorder in children referred to a psychiatric clinic. Am J Psychiatry 159(1):36–42
38. Eiraldi RB, Power TJ, Nezu CM (1997) Patterns of comorbidity associated with subtypes of attention deficit-hyperactivity disorder among 6 to 12 years-old children. J Am Acad Child Adolesc Psychiatry 36(4):503–514
39. Tannock R (1994) Attention deficit disorders with anxiety disorders. In: Brown TE (ed) Subtypes of attention deficit disorders in children, adolescents and adults. American Psychiatric Press, New York
40. Barkley R (2005) Attention-deficit hyperactivity disorder: a handbook for diagnosis and treatment, 3rd edn. The Guilford Press, New York
41. Hynd GW, Lorys AR, Semrud-Clikeman M, Nieves N, Huettner MI, Lahey BB (1991) Attention deficit disorder without hyperactivity: a distinct behavioral and neurocognitive syndrome. J Child Neurol 6 (Suppl):S37–S43
42. Gadow KD, Drabick DA, Loney J et al (2004) Comparison of ADHD symptom subtypes as source-specific syndromes. J Child Psychol Psychiatry 45(6):1135–1149
43. Lahey BB, Pelham WE, Loney J, Lee SS, Willcutt E (2005) Instability of the DSM-IV subtypes of ADHD from preschool through elementary school. Arch Gen Psychiatry 62(8):896–902
44. Doyle R (2004) The history of adult attention-deficit/hyperactivity disorder. Psychiatr Clin North Am 27(2):203–214
45. Scahill L, Schwab-Stone M (2000) Epidemiology of ADHD in school-age children. Child Adolesc Psychiatr Clin N Am 9(3):541–555
46. Cantwell D (1997) Introduction. The scientific study of child and adolescent psychopathology: the attention deficit disorder syndrome. J Am Acad Child Adolesc Psychiatry 36(8):1033–1035
47. Cohen P, Cohen J, Kasen S et al (1993) An epidemiological study of disorders in late childhood and adolescence. I. Age and gender-specific prevalence. J Child Psychol Psychiatr 34(6):851–867
48. Gaub M, Carlson CL (1997) Gender differences in ADHD: a meta-analysis and critical review. J Am Acad Child Adolesc Psychiatry 36(12):1706–1714
49. Bird H, Gould M, Yager T, Staghezza B, Canino G (1989) Risk factors for maladjustment in Puerto Rican children. J Am Acad Child Adolesc Psychiatry 28(6):847–850
50. Counts CA, Nigg JT, Stawicki JA, Rappley MD, von Eye A (2005) Family adversity in DSM-IV ADHD combined and inattentive subtypes and associated disruptive behavior problems. J Am Acad Child Adolesc Psychiatry 44(7):690–698
51. Scahill L, Schwab-Stone M, Merikangas KR, Leckman JF, Zhang H, Kasl S (1999) Psychosocial and clinical correlates of ADHD in a community sample of school-age children. J Am Acad Child Adolesc Psychiatry 38(8):976–984
52. Peña JA, Montiel-Nava C (2003) El trastorno por déficit de atención-hiperactividad ¿mito o realidad? Revista de Neurología 36(2):173–179
53. Rohde LA (2002) ADHD in Brazil: the DSM-IV criteria in a culturally different population. J Am Acad Child Adolesc Psychiatry 41(9):1131–1133
54. Farré-Riba A, Narbona J (1997) Escala de Conners en la evaluación del trastorno por déficit de atención con hiperactividad: nuevo estudio factorial en niños españoles. Rev Neurol 25(138):200–204
55. MacLeod RJ, McNamee JE, Boyle MH, Offord DR, Friedrich M (1999) Identification of childhood psychiatric disorder by informant: comparison of clinic and community samples. Can J Psychiatry 44(2):144–150
56. Steele R, Forehand R, Devine D (1996) Adolescent social and cognitive competence: cross-informant and intra-individual consistency across three years. J Clin Child Psychol 25(1):60–65

57. Amador-Campos JA, Forns-Santacana M, Guardia-Olmos J, Pero-Cebollero M (2006) DSM-IV attention deficit hyperactivity disorder symptoms: agreement between informants in prevalence and factor structure at different ages. J Behav Asses 28(1):23–32
58. Biederman J, Faraone SV, Monuteaux MC, Grossbard JR (2004) How informative are parent reports of attention-deficit/hyperactivity disorder symptoms for assessing outcome in clinical trials of long-acting treatments? A pooled analysis of parents' and teachers' reports. Pediatrics 113(6):1667–1671
59. Polanczyk G, Rohde LA (2007) Epidemiology of attention-deficit/hyperactivity disorder across the lifespan. Curr Opin Psychiatry 20(4):386–392