

Do You See It My Way? The Clinical Evaluation of ADHD by the Different Pediatric Subspecialties

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ABSTRACT: **Background:** Three medical disciplines are responsible for assessment, diagnosis and treatment of people with attention deficit hyperactivity disorder (ADHD) in Israel: pediatricians/family doctors, adult and child neurologists, and adult and child psychiatrists.

Objectives: To investigate differences in ADHD diagnostic practices between three different pediatric subspecialties in the clinical setting in order to establish a common ground for a future unified approach.

Methods: An anonymous web-based questionnaire was administered to child psychiatrists, pediatric neurologists and general pediatricians who are actively involved in ADHD diagnosis (n=104).

Results: Neurologists and pediatricians rarely use the mental status examination, while psychiatrists rarely perform a neurological or physical examination ($P < 0.0001$). A general clinical impression of learning abilities and/or neurodevelopmental skills was implemented more often by pediatric neurologists ($P < 0.04$).

Conclusions: The significant differences found between the three medical specialties with regard to the clinical evaluation of ADHD could be attributed, at least in part, to the ambiguity of available guidelines concerning the clinical examination, and to the adherence of each specialty to its own "skills." Larger surveys in other countries should be considered and an effort made to create a common, "inter-disciplinary" ground on this important part of ADHD evaluation, differential diagnosis, and research.

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criteria, and by the use of rating scales answered by both parents and teachers or other caregivers familiar with the patient. As for the direct clinical impression and/or examination, guidelines tend to be less descriptive. The NICE [1] Guideline 2008 states that the diagnosis should be based on "a full clinical and psychosocial assessment of the person; this should include discussion about behavior and symptoms in the different domains and settings of the person's everyday life, a full developmental and psychiatric history, and observer reports and assessment of the person's mental state." Tools to use in the assessment of younger school-age children are not specifically described.

In the American Association of Pediatrics (AAP) Clinical Practice Guidelines for the Diagnosis, Evaluation & Treatment of ADHD, from 2011 [2,3], aimed at primary care physicians, the clinician is asked (in Recommendation 2) to establish DSM criteria [4] by obtaining reports from those involved in the child's care. With regard to the direct clinical evaluation of the child/adolescent, the Guidelines require a "clinical interview with the child" and an updated physical examination (including hearing and vision). Here, again, the nature and content of the "clinical interview" is not specifically described.

The American Academy of Child and Adolescent Psychiatry practice parameters from 2007 [3] (Recommendation 2) ask the clinician to first interview caregivers, and then to evaluate the child or adolescent. The guidelines mention that the primary purpose of the interview with the child or adolescent is not to confirm or refute the diagnosis of ADHD; rather it is meant to "to identify signs or symptoms inconsistent with ADHD or suggestive of other serious co-morbid disorders." The authors explain that "Young children are often unaware of their symptoms of ADHD, and older children and adolescents may be aware of symptoms but will minimize their significance." Therefore, it is recommended that the clinician perform a mental status examination, assessing appearance, sensorial, mood, affect, and thought processes. No other clinical tools, (e.g., neurodevelopmental assessment or a neurological examination), except for the mental status examination, are mentioned. ICD-10 [5] does not mention a physical exam at all in the context of ADHD or its differential diagnosis (World Health Organization, 1993). To date, The American Academy of Neurology (AAN)

The diagnostic process required in attention deficit hyperactivity disorder (ADHD) is described by several consensus statements and guidelines in the medical literature worldwide [1-3]. Most guidelines describe in great detail how to gather information regarding the patient's functioning and symptoms of ADHD by performing both an open interview and a structured interview in accordance with the DSM-5 and/or ICD-10

Table 1. Description of the direct* clinical evaluation of the child/adolescent by the three medical disciplines

Question: Which of the following items are included in your diagnostic evaluation of ADHD?	Psychiatrists	Neurologists	Pediatricians	P
An open Interview with parents or caregivers Regularly/Other	33/0 (100%)	29/0 (100%)	42/0 (100%)	NS
A structured interview in accordance with DSM criteria Regularly/Other	22/10 (68.8%/31.2%)	23/4 (85.2%/14.8%)	40/2 (95.2%/4.8%)	< 0.008
A neurological examination Regularly/Other	1/31 (3.1%/96.9%)	29/0 (100%/0%)	32/11 (59.6%/40.4%)	< 0.0001
A physical examination Regularly/Other	1/29 (3.3%/96.7%)	25/3 (89.3%/10.7%)	36/7 (83.7%/16.3%)	< 0.0001
Clinical impression from learning abilities, and/or neurodevelopment Regularly/Other	23/10 (69.7%/30.3%)	26/3 (89.7%/10.3%)	27/16 (62.8%/37.2%)	< 0.04
Psychiatric evaluation (mental status) Regularly/Other	33/0 (100%/0%)	3/17 (15%/85%)	7/29 (19.4%/80.6%)	< 0.0001

*Excluding use of rating scales, questionnaires, or computerized tests

** Yes = usually, Other = occasionally, rarely, never

and the Child Neurology Society (CNS) have not published guidelines or a consensus regarding the clinical tools for the diagnosis of ADHD.

In Israel, the official Ministry of Health Guidelines [6], published in 2010, describe in detail the tools that should be used in the diagnostic process of ADHD in both adults and children, including a detailed history, establishing symptoms in accordance with DSM criteria, the use of rating scales and questionnaires, and the necessity to evaluate co-morbidity and consider the differential diagnosis. When it comes to the clinical evaluation, the guidelines only ask for it to be a “thorough” examination, without further details. Psychiatric evaluation, cognitive or psycho-educational assessment, is defined as optional.

Doodley et al. [7] found that for the majority of children (including children with ADHD) the critical component of the pediatric neurology consultation is a detailed clinical history, but most clinicians agree that physical examination is at least necessary to rule out other conditions in the differential diagnosis of ADHD [1-10]. In most countries, several (pediatric) subspecialists – such as primary care pediatricians/family physicians, developmental-behavioral pediatricians, pediatric neurologists and child psychiatrists – are involved in the initial diagnosis and care of children with ADHD. The present Practice Guidelines, coming from both Pediatric/Family practice and from Psychiatry, as earlier mentioned, do not provide a common ground from which these various disciplines can derive a common understanding on how to clinically assess their pediatric patients. In light of this ambiguity, the aim of the present survey was to study the clinical tools used by different medical disciplines with regard to the examination of the child and/or

adolescent suspected of having ADHD. We hypothesized that while all disciplines use similar tools to elicit DSM-5/ICD-10 criteria for the diagnosis, their ways of obtaining direct clinical impression of the patient are diverse.

SUBJECTS AND METHODS

An anonymous web-based questionnaire was administered to physicians who are actively involved in the diagnosis and treatment of children and adolescents with ADHD, in both the public and private sectors. In Israel, child psychiatrists and pediatric neurologists, as well as primary care pediatricians with Ministry of Health continuing medical education (CME) training in ADHD are involved in the diagnosis of the disorder, while the continuous management and treatment are usually managed by the primary care pediatrician. These physicians were personally approached at medical conferences and local seminars, and others were contacted by telephone, and urged by the study investigators to answer the web-based questionnaire. All were informed of the anonymous nature of the questionnaire.

The questionnaire included 30 questions, most with 4 possible answers (regularly, sometimes, rarely, never) or other choices relevant to the questions. Questions reviewed the demographic and professional characteristics of the physician and description of his/her work environment, and his/her ADHD diagnostic protocol, with a special emphasis on the direct clinical encounter with the patient. Other questions reviewed the physician's preferences with regard to ADHD clinical guidelines and participation in continuous education activities and conferences. The questions relevant to the description of the clinical diagnostic process were translated to English [Table 1]. The study was approved by the Medical Center Ethics Committee no. TLV-0457-14.

STATISTICAL ANALYSIS

All participants were grouped into three categories in accordance with their medical specialty. Descriptive statistics were used to analyze the demographic data such as age and years of experience using one-way ANOVA. In some of the questions we merged several answers into a joint category, e.g., place of medical school or residency were recategorized to “Israel” or “other.” The answers to elements of the clinical impression performed were grouped into two categories: “regularly” or “other” instead of “sometimes,” “rarely” or “never.” The total duration of examination was restructured as 15 minutes, up to one hour, or over an hour. The number of visits was regarded as one or more. Follow-up frequency was analyzed in three categories instead of six (> 3 per year, 1–2 per year, or as needed). Patients' ages were divided into all ages vs. 6–18 years old. All questions were compared using χ^2 tests between-group rates; significant values were those for which the *P* value was < 0.05.

RESULTS

A total of 104 physicians completed the questionnaire, 42 pediatricians, 33 child psychiatrists, and 29 pediatric neurologists. No significant differences were found between the three medical specialties with regard to demographic characteristics (age, gender, and country of birth, country of medical studies, country of internship or years of experience); 69.9% graduated from medical schools in Israel, and 93.3% completed their residency in Israel. The mean time of active medical practice after residency was 16.03 years (SD 9.8), with no significant difference between the three medical specialties [Table 2]. Pediatricians gained their knowledge regarding ADHD in the CME courses, while psychiatrists and neurologists reported to have acquired their knowledge during their primary residency ($P < 0.0001$). Pediatricians usually evaluated ADHD patients within their primary care pediatric practice (mostly in the public sector), while pediatric neurologists and child psychiatrists divided their practices between the public sector and private consultations ($P < 0.001$). Pediatric neurologists were significantly more involved in the diagnosis and treatment of preschool children (younger than 6 years), while the other two specialties reported that they treated patients between the ages of 6 and 18 years ($P < 0.0001$). Question 12 in the questionnaire was devoted to the details of the clinical examination of children evaluated for ADHD [Table 1]. All groups reported that they conducted an open interview with the parents, with no significant difference between the three specialties. Pediatricians used a structured interview in accordance with the DSM-5 criteria significantly more than the other specialties ($P < 0.008$). A most striking difference was found with regard to the neurological examination: with 31/32 psychiatrists (96.6%) reporting that they do not regularly perform this examination and only three of them reporting they perform it sometimes, while 74% of pediatricians and 100% of pediatric neurologists report performing a neurological examination regularly during the initial evaluation of their patients ($P < 0.0001$). All the child psychiatrists reported regularly performing a mental status examination/interview as part of their clinical evaluation of the patient, but only 19% and 15% of pediatricians and pediatric neurologists, respectively, reported doing so regularly ($P < 0.0001$), while 7/29 pediatricians and 3/17 neurologists reported assessing it sometimes. Furthermore, 89% and 83% of neurologists and pediatricians, respectively, regularly perform a general physical examination, while 3% of psychiatrists report doing so ($P < 0.0001$). As for a general evaluation of learning abilities and/or neurodevelopment, e.g., reading, writing, mathematical, memory, grapho-motor abilities, expressive and receptive language, general knowledge, etc. (some or all of these), 89.7% of neurologists, 69.7% of psychiatrists and 62.8% of pediatricians reported regularly assessing these skills ($P < 0.04$).

All specialists reported using parental and teacher rating scales (93% and 95% respectively), such as the Vanderbilt or

Table 2. Demographic data of the physicians who participated in the survey

Demographic data	Psychiatrists	Neurologists	Pediatricians	P
Gender Female/Male	23/10 (69.7%/30.3%)	16/13 (55.2%/44.8%)	21/21 (50%/50%)	NS
Age (yrs) Mean (SD)	51.4 (9.8)	51.8 (8.7)	53.6 (7.1)	NS
Place of birth Israel/Other	16/17 (48.5%/51.5%)	19/10 (65.5%/34.5%)	16/27 (37.2%/62.8%)	NS
Country of medical school Israel/Other	25/7 (78.1%/21.9%)	20/9 (69%/31%)	27/15 (64.3%/35.7%)	NS
Country of internship Israel/Other	32/1 (97%/3%)	27/2 (93.1%/6.9%)	38/4 (90.5%/9.5%)	NS
Professional experience (yrs) Mean (SD)	15.45 (11.2)	13.93 (10.9)	18.18 (7.5)	NS
Patients' age range 6–18 yrs/ $<$ 6 yrs	19/14 (57.6%/42.4%)	6/23 (20.7%/79.3%)	32/11 (74.4%/25.6%)	$<$ 0.001
ADHD knowledge acquisition Internship/CME	31/1 (96.9%/3.1%)	26/2 (92.9%/7.1%)	5/38 (11.6%/88.4%)	$<$ 0.001

Conner, with no significant difference between the groups, but only 37.5% of the whole group reported using a co-morbidity rating scale, with no significant difference between the specialties. Pediatricians reported that they rarely or never ask for a psycho-educational evaluation as part of the initial ADHD diagnostic process, while psychiatrists and neurologists do so more often (14%–15% of the cases) ($P < 0.0001$). Of all physicians, 54% reported using a computerized performance test (CPT) as part of their initial diagnostic process, but psychiatrists tended to use these tests more often ($P < 0.023$). Regarding duration of testing, 59.2% of respondents reported that their evaluation takes more than 60 minutes, while the others reported a single diagnostic visit to be shorter than 60 minutes, with no significant difference between the groups. Psychiatrists need more than one visit to complete the diagnostic process, significantly more often than the other disciplines ($P < 0.0001$). Moreover, 52.4% of physicians reported regularly including another professional in their diagnostic process (a psychologist, social worker, nurse or student), with no significant difference between the specialties.

Blood tests and electroencephalogram (EEG) are recommended significantly more often by psychiatrists ($P < 0.011$). Vision and hearing tests are recommended as an integral part of the ADHD evaluation by only 34–35% of the physicians, with no significant differences between the specialties. Pediatricians and psychiatrists request more frequent follow-up visits ($>$ 3 per year) than neurologists ($P < 0.004$).

As for Continuous Medical Education activities, most physicians (64%) reported attending at least one workshop or ADHD conference annually. Pediatricians and pediatric neurologists (48.8% and 51.7%) stated that they refer to the AAP guidelines regarding ADHD, while only 9.1% of psychiatrists reported using these guidelines ($P < 0.0001$); 72.7% of psychiatrists reported referring to the AACAP guidelines, compared to 23% and 10%

of pediatricians and neurologists. No significant differences were found between the three specialties with regard to the use of local guidelines (Ministry of Health and the local Pediatric Association guidelines). Only 8.6% reported that they do not refer to any guidelines in their routine ADHD diagnostic process.

DISCUSSION

Our survey showed that physicians from all three medical specialties involved in ADHD diagnosis apply similar protocols with regard to obtaining the DSM-5 or ICD-10 criteria from parental or caregiver interviews, and by using well-accepted rating scales. The direct clinical examination of children and adolescents, however, differs significantly between the specialties. Neurologists and general pediatricians rarely use the mental status examination as a routine tool, while psychiatrists rarely perform a neurological or physical examination. A general clinical impression of learning abilities and/or neurodevelopment skills is reported to be included as part of ADHD evaluation significantly more often by pediatric neurologists than by the other two disciplines. Pediatricians rarely ask for a psycho-educational evaluation as part of their ADHD evaluation. Laboratory tests are significantly more often recommended by psychiatrists. Surprisingly, and despite present guidelines, only 35% of all physicians ask for a vision and hearing test as part of their initial evaluation. Practitioners from different medical specialties tend to use their “own” guidelines with regard to the diagnostic protocol. In a recent study [11] of the clinical practices used by developmental-behavioral pediatricians (DBPs) in the United States, using the DBPnet, the authors found that DBPs were highly likely to complete comprehensive assessments of ADHD that went beyond the requirements of primary care (AAP) practice guidelines. They typically identified coexisting developmental and learning conditions. In our survey, such practices were partly reported by pediatric neurologists, but not by the other medical specialties.

The weakness of this survey is its small size, reflecting local practices in our country, and the fact that surveys only show what the respondent chooses to report. While it has its limitations, we believe the very significant differences found between the medical disciplines reflect the present ambiguity of global consensus statements and clinical guidelines with regard to the specifics of the clinical evaluation of the child or adolescent. As we mentioned earlier, most of these guidelines are very descriptive and specific with regard to the tools used to elicit DSM-5/ICD-10 behavioral criteria, but are less descriptive and at times confusing with regard to the nature of the clinical examination.

It seems that the guidelines recommend using diagnostic tools that are familiar to each medical specialty, avoiding a more “holistic” approach to the examination.

CONCLUSIONS

While the contribution of the clinical impression of ADHD in the setting of the physician’s office is known to be limited, as it does not reflect the child’s natural environments, we feel the significant differences described here should at least prompt further and larger surveys in other countries. To the best of our knowledge no such surveys have been reported. If indeed similar differences are found in other countries, an effort should be made to reach a common interdisciplinary ground with regard to the actual clinical examination of the child or adolescent with ADHD. It is essential not only for the correct differential diagnosis but also for creating a uniform language with regard to ADHD science and research

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“If you tell the truth, you don’t have to remember anything”

Mark Twain (1835-1910), American writer, best known for his novels *The Adventures of Tom Sawyer* and its sequel, *Adventures of Huckleberry Finn*, the latter often called “The Great American Novel”