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ADHD Prevalence in Adult Outpatients With Nonpsychotic Psychiatric Illnesses

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Objective: The prevalence of ADHD in the general adult population has been estimated to be about 4.4%. However, few studies exist in which the prevalence of ADHD in psychiatric adult outpatient samples has been estimated. These studies suggest that the prevalence is higher than in the general population. The objective of this study is to estimate the prevalence of ADHD in a psychiatric nonpsychotic adult outpatient sample and to compare this data with the prevalence of a group of nonclinical participants. **Method:** The structured clinical interview Mini International Neuropsychiatric Interview (M.I.N.I.-Plus) was applied to 161 consecutive nonpsychotic psychiatric adult outpatients and to 149 healthy participants from the community. In addition, clinical rating scales were applied to measure the severity of general psychopathology such as mania, anxiety, depression, ADHD, and alcohol consumption in both groups. **Results:** The prevalence of ADHD in psychiatric nonpsychotic adult outpatients was 16.80% and 5.37% in nonclinical participants. In male psychiatric outpatients the prevalence of ADHD was 8.5% and for females was 21.6%. **Conclusion:** This study concludes that a higher prevalence of ADHD exists in psychiatric nonpsychotic adult outpatients compared with nonclinical participants. In the psychiatric adult outpatients, females showed a higher prevalence of ADHD than males. Implications and limitations are discussed. (*J. of Att. Dis.* 2007; 11(2) 150-156)

Keywords: ADHD; adults; prevalence; psychiatric outpatients

ADHD was originally conceptualized as a specific childhood disorder; however, clinicians and researchers have recently recognized that ADHD affects adults as well and in higher frequency than was believed. It has been estimated that in the general population ADHD affects between 2% to 9% in school-age children and between 3% to 5% in adults (Biederman, 2005). The assessment and diagnosis of ADHD in adults is commonly made according to *Diagnostic and Statistical Manual of Mental Disorders-Text Revision (DSM-IV TR;* American Psychiatric Association, 2000) criteria. This manual considers the same diagnostic criteria for ADHD for adults as well as for children or adolescents. Nevertheless, some authors have questioned the persistence of ADHD in adulthood (Shaffer, 1994), debating that there exists over time a symptomathological

decline. Hill and Schoener (1996) published a study that included the analysis of nine prospective studies in children with ADHD that were followed up during a variable period of time ranging from 4 to 16 years depending on the study. The results reported by Hill and Schoener were a 50% decrease in symptomathology of ADHD per 5-year period. Despite this fact, several

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long-term prospective studies done in young adults who were diagnosed with ADHD during childhood have demonstrated the complete or partial persistence of the disorder in different percentages ranging from 4.5% to 66% depending on the diagnostic criteria used and of the published study (Barkley, Murphy, & Kwasnik, 1996; Biederman, Faraone, Milberger, & Guite, 1996; Biederman, Mick, & Faraone, 2000; Gittelman, Mannuzza, & Shenker, 1985; Mannuzza, Klein, Bessler, Malloy, & La Padula, 1993; Weiss et al., 2004). Biederman (1998) reviewed psychiatric literature to summarize the evidence on the descriptive, predictive, and concurrent validity of ADHD in adults. According to this review, the literature shows that this disorder can be diagnosed consistently in adults and that the diagnosis possesses a predictive value of complications and response to treatment.

In addition, there exists evidence about genetic transmission, specific treatment response, performance in neuropsychological test, and functional and structural brain abnormalities in children, adolescents, and adults with ADHD (Biederman, 2005; Biederman et al., 1993; Biederman et al., 1995; Bresnahan, Anderson, & Barry, 1999; Castellanos et al., 2002; Ernst et al., 2003; Øie & Rund, 1999; Paterson, Douglas, Hallmayer, Hagan, & Krupenia, 1999; Rubia et al., 1999; Spencer et al., 1998). On the other hand, studies have also shown that ADHD develops into diverse psychiatric diseases and causes social, family, occupational, and educational impairment. In a prospective study done by Mannuzza, Klein, Bessler, Malloy, and La Padula (1998) in which 85 children with ADHD and 73 healthy controls were assessed from age 7 to 24 years, 12% of those children with ADHD had antisocial personality disorder by the time they reached age 24 years. In contrast, only 3% of the controls exhibited this disorder. In addition, 12% of the ADHD participants and 4% of the controls met criteria for nonalcoholic substance abuse. Another study reported that 45% of young prison inmates were diagnosed with ADHD (Rosler et al., 2004). The comorbidity between ADHD and mood, anxiety, and substance abuse disorders is around 30%, 50%, and 35%, respectively (Biederman, 2005; Biederman et al., 2004).

The published studies concerning the prevalence of ADHD in psychiatric adults are few. Alpert et al. (1996) reported that 12% of 116 patients between age 18 to 64 years who sought treatment for major depressive disorder had ADHD. Dalsgaard, Mortensen, Frydenberg, and Thomsen (2002) found that of the 208 adults with ADHD 47 of them (22.6%) were admitted in a psychiatric hospital because of diverse illnesses; females had an increased risk of being hospitalized as opposed to males (hazard ratio: 2.4; confidence interval [CI] 95%, 1.1-5.6). Kennemer and Goldstein (2005) carried out a

retrospective file review of 292 psychiatric adult inpatients to know the prevalence of ADHD. They found that only six inpatients were diagnosed with ADHD.

On the other hand, most studies have methodological limitations. For example, Lomas and Gartside (1999) studied a peculiar sample mostly composed of war veterans who sought attention to outpatient psychiatric facility and found a prevalence of 50% of ADHD. Besides, not one of the studies mentioned used diagnostic structured interviews, neither inquired about the prevalence of ADHD by gender, and the diagnosis of ADHD was based only on files. Given these data, we hold the hypothesis that the prevalence of ADHD in psychiatric adult outpatients has not been sufficiently studied. For that reason, the purpose of the current study is to establish global and gender prevalence of ADHD in a sample of psychiatric adult outpatients.

Method

Participants

The study involved a total of 310 participants of which 161 were consecutive psychiatric nonpsychotic outpatients (psychiatric clinical population). The selection criteria for psychiatric patients were being males or females between age 18 to 55 years, who sought mental health consultation at the Centro Comunitario de Salud Mental in the city of Querétaro, Mexico, from January 2003 to October 2005, and whose main complaints were something other than ADHD symptoms. We excluded those patients who presented any of the following conditions: history of any psychotic disease in the present or in the past, recent suicidal attempt (2 months to the date of the interview), any medical condition, mania or hypomania, substance intoxication or substance abstinence syndrome, suspicion of delirium from any cause, dementia, mental retardation, hearing or visual impairment, or nonacceptance to participate in the study. In addition, for the 149 participants who were males or females between age 18 to 55 years, who came from the community to the mental health outpatient service for other reasons than psychiatric consultation, we called them the "nonclinical population." We selected those participants in the study if they had no prior history of psychiatric service assistance or psychiatric treatment in their lives, no first-degree relatives with ADHD or any other psychiatric disease, or if they had any medical condition. We asked the participants directly about the history of a possible relative with ADHD in their family. We did so based on an explanation of what ADHD is and responding to all doubts from the volunteers, to be sure that they understood clearly what ADHD is. They were asked to participate voluntarily in the study. Fifty percent were medical students, 40% were

workers of the department of health of Querétaro city not related with mental health, and 10% were a miscellaneous group that included agents of the pharmaceutical industry, messengers, workers of the telephone and electricity companies who add service to the mental health outpatient service. The exclusion criteria for this group were participants with neurological disorder, substance intoxication or substance abstinence syndrome, clinical suspicion of mental retardation, mania or hypomania, and any physical illness, which according to clinical judgment, could be relevant to the diagnosis of ADHD.

Procedures

Two experimented clinicians (L.G.A.M., A.O.H.G.) applied Mini International Neuropsychiatric Interview (M.I.N.I.-Plus in Spanish version; Sheehan et al., 1998). A different clinician blind to the M.I.N.I.-Plus results applied and scored all the rating scales. After fully explaining the study to the all participants (psychiatric outpatients and nonclinical population), a written informed consent was obtained. This study was approved by the Institutional Review Board (IRB) of the Hospital General de Querétaro, México.

Measures

A medical-psychiatric history and the structured interview M.I.N.I.-Plus were administered to all participants. In addition, the following rating scales were applied: screening and severity scales for ADHD in adults (Friederichsen, Almeida, Serrano, Cortés, Test: FASCT), self-report (FASCTA) and observer (FASCTO) versions, recently constructed and validated in Mexican adult population (Almeida et al., 2006), Young Mania Rating Scale (YMRS; Young, Biggs, Ziegler, & Meyer, 1978), Alcohol Use Disorders Identification Test (AUDIT; Allen, Litten, Fertig, & Babot, 1997; Saunders, Aasland, Babor, dela Fuente, & Grant, 1993), Symptom Check List-90 (SCL-90; Derogatis, Lipman, & Covi, 1973), Hamilton Depression Rating Scale (HDRS), and Hamilton Anxiety Rating Scale (HARS; Hamilton, 1959, 1960).

The validity clinimetric data of FASCTA are sensibility = 80.36, specificity = 97.99, positive predictive value = 93.75, negative predictive value = 92.99. For FASCTO the data are sensibility = 95.45, specificity = 96.39, positive predictive value = 87.50, negative predictive value = 98.77. The correlation between both versions was $r = .88$, $p = .001$. Correlation intraclass coefficient was of .570 CI 95% (.157-.781), $p = .007$, for FASCTA and .670 CI 95% (.267-.864), $p = .002$ for FASCTO. More

detailed information about validity and reliability of both versions has been published elsewhere (Almeida et al., 2006).

Statistical Analysis

For nominal variables, a chi-square test (χ^2) was used. To test the normal distribution of the numerical data, the Kolmogorov-Smirnov test was used, and according to the results, a t test (two-tailed) or Mann-Whitney U test was used. The agreement degree of the diagnosis of ADHD through M.I.N.I.-Plus between two clinicians was calculated by the Kappa index (k). The value of k index was of .85. All statistical analysis was done using SPSS version 12.0.

Results

The sociodemographic characteristics of the sample according to each group, as well as the contrast measures between them, are displayed in the Table 1. A total of 310 participants were enrolled in the study: 51.9% were psychiatric clinical population and 48.1% were nonclinical population. According to the M.I.N.I.-Plus, the prevalence of ADHD in psychiatric clinical adult outpatients was of 16.80%, in contrast, the prevalence for nonclinical population was of 5.37% ($\chi^2 = 8.680$, $df = 1$, $p = .003$). The diagnoses aside from ADHD in the psychiatric clinical population are shown in Table 2. The prevalence of ADHD by gender in psychiatric clinical population was 21.6% for females and 8.5% for males ($\chi^2 = 4.59$, $df = 1$, $p = .032$). On the other hand, the prevalence of ADHD by gender in nonclinical population was 7.1% for females and 4.1% for males ($\chi^2 = 0.494$, $df = 1$, $p = .482$).

In Table 2 we present the comorbid diagnosis of ADHD made to the psychiatric clinical population, and we found that in those participants with ADHD who sought psychiatric treatment, the affective and the anxiety disorders were the more frequently comorbid diagnoses in adults with ADHD. On the other hand, we compared the severity of the psychopathology in the participants diagnosed with ADHD by means of the M.I.N.I.-Plus interview.

In Figure 1 we present the results for all those participants (clinical psychiatric population and nonclinical population) diagnosed with ADHD by means of the M.I.N.I.-Plus interview and found that those participants with ADHD presented more severity of affective and anxiety symptoms than those participants without ADHD, without regarding if they sought psychiatric attention or not.

Table 1
Sociodemographic Characteristics of the Sample^a

	Nonclinical Population (<i>n</i> = 149)	Psychiatric Clinical Population (<i>n</i> = 161)	
Age	28.50 ($\pm$ 10.87)	28.39 ($\pm$ 10.77)	M.U. = 11719.00; <i>Z</i> : 0-0.3; <i>p</i> = .72
Females	67.1%	63.3%	χ^2 = 0.482; <i>gl</i> :1; <i>p</i> = .48
Males	32.9%	36.7%	
Married	34.5%	4.2%	χ^2 = 37.69; <i>gl</i> :1; <i>p</i> = .000
Separated or divorced	19.3%	42.0%	
Educational level (years)	14.78 ($\pm$ 4.7)	12.50 ($\pm$ 5.03)	M.U. = 8750.50; <i>Z</i> : -3.9; <i>p</i> = .000
Race			
Hispanic	100%	100%	—
White	0%	0%	
Other	0%	0%	

Note: M.U. = Mann-Whitney U test.

a. Numerical data are shown in means and standard deviation.

Table 2
**Diagnoses Aside From ADHD in the Psychiatric
Clinical Population^a**

Major depressive disorder	73.50%
High suicide risk	43.59%
Panic disorder	30.77%
Distimic disorder	17.09%
Generalized anxiety disorder	9.40%
Alcohol dependence	8.55%
Agoraphobic disorder	7.69%
Specific phobia	5.98%
Obsessive-compulsive disorder	5.98%
Antisocial personality disorder	3.42%
Substance dependence	.85%
Posttraumatic stress disorder	.85%
Anorexia nervosa	.85%
Hypochondriasis	.85%
Pain disorder	.85%
Adjustment disorder	.85%
Premenstrual dysphoric disorder	.85%
Mixed anxiety-depressive disorder	.85%

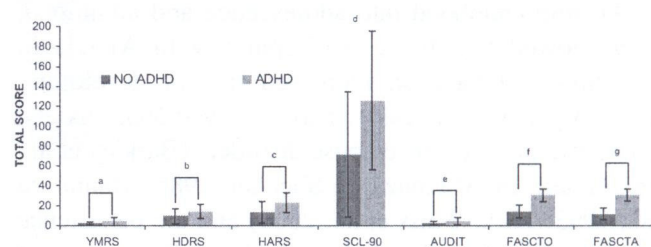
Note: ADHD = attention-deficit/hyperactivity disorder.

a. Some patients had more than one diagnoses.

Discussion

The results of the current study suggest that the prevalence of ADHD is 16.80% in nonpsychotic adults who seek assistance for psychiatric symptoms different than those of ADHD in an outpatient mental health facility and is higher for females than for males. The current study also shows that this prevalence is higher in the clinical population than in the nonclinical population. The current study also suggests that the severity of psychopathology is higher in participants with ADHD than in those without ADHD.

Figure 1
**Total Score Comparisons Between Participants
With ADHD and Participants Without ADHD
(Means and Standard Deviations)**



Note: ADHD = attention-deficit/hyperactivity disorder; YMRS = Young Mania Rating Scale; HDRS = Hamilton Depression Rating Scale; HARS = Hamilton Anxiety Rating Scale; SCL-90 = Symptom Check List-90; AUDIT = Alcohol Use Disorders Identification Test; FASCTO = Friederichsen, Almeida, Serrano, Cortés Test-observer; FASCTA = Friederichsen, Almeida, Serrano, Cortés Test-self-report. In all comparisons between groups the number of participants without ADHD was 240, and those with ADHD was 70.

a. Mann-Whitney: 2,579.5; *df* = 60.25; *z* = -3.36; *p* = .001.

b. Mann-Whitney: 2,415; *df* = 83.8; *z* = -3.76; *p* = .000.

c. Mann-Whitney: 1,896.5; *df* = 85.03; *z* = -5.20; *p* = .000.

d. Mann-Whitney: 2,014; *df* = 71.85; *z* = -4.83; *p* = .000.

e. Mann-Whitney: 681.50; *df* = 55.13; *z* = -7.26; *p* = .000.

f. Mann-Whitney: 248.00; *df* = 79.50; *z* = -9.79; *p* = .000.

g. Mann-Whitney: 838.50; *df* = 33.26; *z* = -3.461; *p* = .001.

The current study was done exclusively with Mexican Hispanic patients, and we do not know of other published studies conducted with this specific population. In addition, the severity of ADHD was measured using a scale constructed and validated with Mexican Hispanic patients. Also, the current study calculated the prevalence of ADHD by gender, data not published to our knowledge.

We also found that participants with ADHD showed a higher severity of their psychopathological symptoms than those participants without ADHD. This result is consistent with the results of other published studies, which have demonstrated a high comorbidity between ADHD with several psychiatric pathologies (Barkley et al., 1996; Biederman, 2005; Helgeland, Kjelsberg, & Torgersen, 2005; McGough et al., 2005). On the other hand, we used a structured interview according to the *DSM-IV-TR* criteria, and we obtained a good value of Kappa index; this kind of methodology was not used in other studies. We also found that the psychiatric clinical population showed fewer educational years and had higher percentages of being separated or divorced than the nonclinical population—results that are similar to those reported by Rapaport, Clary, Fayyad, and Endicott (2005).

According to the epidemiological studies done in the United States, the prevalence of ADHD in adults in the general population is approximately 4% (Biederman, 2005), and in our sample of Mexican nonclinical population, we found a similar prevalence. Although there exists several studies published concerning the evolution of ADHD from childhood into adolescence and adulthood, which showed that those participants with ADHD in their childhood have an increased risk of developing diverse psychiatric illnesses, particularly mood, anxiety, personality, and substance abuse disorders (Barkley et al., 1996; Gittelman, Mannuzza, & Shenker, 1985; Mannuzza et al., 1993, 1998; Weiss et al., 2004) and the persistence of the partial or full disorder in adulthood (Biederman et al., 2000), there are few published studies regarding the prevalence of this disorder in psychiatric adult outpatients. In this work, we confirmed that adults with ADHD have a high comorbidity with mood, anxiety, and substance abuse disorders but additionally found a high percentage (43%) of patients with suicide risk (Table 2).

It is surprising to note that we observed that the females showed a higher prevalence of ADHD than males. In our opinion there exists two possible explanations for this result: (a) maybe this reflects a reference bias because the percentage of patients who went to psychiatric consultation in this mental health center during study period was higher for females than for males; however, at the same time it is an expected result because the two main causes of psychiatric attention in this sample were depressive and anxiety disorders, which is consistent with the results of other authors who have reported a higher comorbidity with anxiety and depressive disorders in women with ADHD than in men with ADHD (Biederman, 2005; Biederman et al., 2004); (b) although Dalsgaard et al. (2002) reported that females with ADHD had a higher risk of psychiatric admission than

males in a heterogeneous psychiatric patients sample, there are no reports concerning a specific analysis of the prevalence by gender, and then we do not know if our result is biased or is a valid result that needs confirmation by other studies.

We found a similar prevalence of ADHD than Alpert et al. (1996) who reported that 12% of patients who sought treatment for major depressive disorder had ADHD. This mild difference may be because we included patients with several psychiatric disorders not only depressed patients as in the Alpert et al. study. Dalsgaard et al. (2002) reported that 22.6% of the adult patients admitted to a psychiatric hospital had the diagnosis of ADHD, and we consider that this slight discrepancy is due to the differences in the samples, inpatients in the Dalsgaard study and outpatients in our report.

In contrast, Kennemer and Goldstein (2005) reported a prevalence of ADHD in psychiatric patients of about 2%, whereas Lomas and Gartside (1996) found a prevalence of 50%. The data of Kennemer and Goldstein were obtained in a retrospective file review based on methodology, our data were acquired through a face-to-face structured interview. Lomas and Gartside (1996) conducted a study of adults, mostly war veterans, who sought attention in an outpatient psychiatric facility, and the higher prevalence reported by them may be due to the particularities of their sample, which differ from our patients.

Limitations

Even though the M.I.N.I.-Plus is based on the *DSM-IV-TR* and International Classification of Diseases and Related Health Problems (ICD-10) criteria, and the Spanish version was used, this structured interview has not been validated in the Mexican population, and this interview does not allow a diagnosis of ADHD subtypes, so we could not report it. Unfortunately, it was not possible to corroborate the absence of a family history of ADHD in nonclinical sample participants, so we based our focus only on the testimony of the participants, which means that the absence of ADHD could not be discarded completely in the relatives of the nonclinical population. The objective of the current study was only to compare the prevalence of ADHD between psychiatric adult outpatients and a sample of nonclinical population participants; however, because of the small sample size, the general prevalence of ADHD in adult nonclinical population must be taken with caution. It is necessary that an epidemiological study using a much higher sample size be conducted to determine this data. However, it is interesting that our results are closer to those recently published by Kessler et al. (2006), who found a prevalence of

ADHD in adults between age 18 and 44 years in a U.S. representative sample of 4.4%. In contrast to the current study, we found a prevalence of 5.37% in the nonclinical population, although our sample size is not representative of the general population.

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