Is Adult ADHD Being Over-Diagnosed?

Authors: Joel Paris[1,2], Venkat Bhat[2], Brett Thombs[1,3]

1. Institute of Community and Family Psychiatry, Lady Davis Institute for Medical Research, Jewish General Hospital, Montreal; Professor of Psychiatry, McGill University

2. Resident, Department of Psychiatry, McGill University.

3. Institute of Community and Family Psychiatry, Lady Davis Institute for Medical Research, Jewish General Hospital, Montreal; Associate Professor of Psychiatry, McGill University

Corresponding author:

Joel Paris M.D.

E-mail: joel.paris@mcgill.ca

address:

Institute of Community and Family Psychiatry

4333 cote Ste. Catherine

Montreal. Quebec, H3T 1E4

Keywords:

1. Over-diagnosis

2. Adult ADHD

Clinical Implications:

1. Over-diagnosis is a problem because it leads to over-treatment.

2. The increasing diagnosis of adult ADHD could lead to stimulant prescriptions for people who would not benefit from them.

3. The diagnosis of adult ADHD should be more systematic and carried out with caution.

Limitations

1. There is little research on over-diagnosis in adult ADHD.
2. Little is known about the effects of long-term use of stimulants in adults, either potential benefits and possible harms.

Word count-2500

Abstract

This review examines offers a perspective on the question as to whether attention-deficit hyperactivity disorder (ADHD) is being over-diagnosed in adults. Considering underlying causes as well as consequences, we conclude that the

diagnosis of adult ADHD should be made cautiously, making use of multiple sources of information including self-report, clinical interviews, collateral information, childhood documentation, and neuropsychological testing. Routine screening with symptom checklists is insufficient, and stimulant response is diagnostically uninformative. The causes of over-diagnosis may include changes in diagnostic thresholds, poor diagnostic practices, and advertising by the pharmaceutical industry. Over-diagnosis leads to overtreatment, and dramatic increases in prescriptions for adult ADHD over the last decade should arouse concern.

The Problem of Over-diagnosis

Over-diagnosis in psychiatry occurs where patients are identified with a mental disorder when they do not have significant impairment and would not be expected to benefit from treatment [1]. These problems can arise even when diagnostic criteria are met, i.e., in the presence of milder symptoms that fall close to or within a normal range on a diagnostic spectrum [2]. Over-diagnosis can lead to unnecessary labeling, unneeded tests, unnecessary therapies and inflated health care costs[1]. In medicine, with the best of intentions, practice has come to favor more tests and more treatments, all of which tend to drive over-diagnosis[2]. This problem may be worsened by a prevailing cultural ethos that "more is

better"[1].

Outside of psychiatry, there are clear examples of over-diagnosis. For example, screening programs designed to detect early stages of certain cancers appear to increase incidence estimates, but may have no discernable effect on mortality [3-7]. At the same time, sensitive diagnostic technologies identify ever-smaller, non-progressing lesions, which can lead to incorrect diagnoses based on subclinical symptoms that rarely lead to overt illness, or "incidentalomas" [2]. Another example involves widened disease definitions due to lowered thresholds, for instance in hypertension, which lead to a larger segment of the population being diagnosed and treated with little evidence that they would benefit, but with measurable risks [2].

Psychiatry has followed this trend. It has been estimated that at least 40-50% of the population will meet criteria for at least one psychiatric diagnosis during their lifetime [8]. The current system of nosology in psychiatry, based on phenomenology, i.e., subjective reports and clinical observations, encourages over-diagnosis. The presence or absence of mental disorders is not defined by biomarkers, allowing diagnostic constructs to describe broad spectra that cross over into normality [9].

Increases in the Diagnosis of Adult ADHD

The problem of establishing valid diagnostic boundaries is exemplified by adult ADHD. This disorder has been diagnosed routinely among children for decades, but frequent identification in adults, particularly in those who were never treated as children, is more recent [10]. The rationale for diagnosing adult ADHD is that more than half of all children who meet criteria for this disorder continue to have clinical symptoms in adulthood [11]. It does not follow, however, that the presence of attention problems in adults always justifies a diagnosis of ADHD, which requires a childhood onset [12].

Adult ADHD, once considered rare, has now become very common. At the population level, the National Comorbidity Study estimated that 4.4% of adults in the USA meet diagnostic criteria [13]. However this estimate of prevalence was based on the broad criteria listed in DSM-5[12] . A rapidly increasing frequency of a once-rare condition may reflect increased recognition, but may also constitute a "diagnostic epidemic" [14]. This is because estimates of prevalence reflect how many people meet diagnostic criteria, but do not necessarily indicate how many people have significant impairment, and whose symptoms would be reduced substantively by treatment.

There is a vast body of literature on ADHD. We searched PubMed using keywords related to adult ADHD and over-diagnosis, but could not find any

empirical articles directly addressing the question of over-diagnosis. We found only three non-empirical articles that even discussed it as a problem [14, 15, 16]. We did, however find articles suggesting that this condition is being under-diagnosed [17, 18], one of which suggested that 16.4% of the adult population could meet criteria if a diagnosis of "broad ADHD" were accepted [19].

Similarly we were not able to find any articles on how clinicians use criteria to make this diagnosis. The absence of "gold standard" measures for diagnosis is a general problem for psychiatry. In the absence of biomarkers, we are limited to assessing signs and symptoms. Moreover, the use of DSM algorithims tends not to be systematic, as shown when clinical diagnoses of major depression [20] or screening methods for bipolar disorder [21] are compared to the results of semi-structured interviews that closely follow the manual. No such studies have been carried out for ADHD, either in children or adults.

However, an important survey from the US reported a sixfold increase between 1994 and 2009 in the proportion of psychiatrist office visits with adult patients in which stimulants were prescribed[22], and an eightfold increase among non-psychiatrists. A doubling of prescription rates between 2004 and 2009 in the UK has also been documented [23]. These dramatic changes most probably reflect changes in diagnostic practices and raise concern that some proportion of the increase may come from prescriptions to patients who would not be expected to

benefit and, thus, reflect overdiagnosis.

Pitfalls Leading to Over-Diagnosis of Adult ADHD

1) Flawed diagnostic criteria

The DSM-5 criteria for adult ADHD are so broad that they fail to distinguish between illness and normal variation. But even if we were to accept these criteria as valid, the current definition is heterogeneous. It is well established that childhood ADHD responds best to stimulants when hyperactivity is most prominent, whereas inattentive symptoms are less responsive [24]. That suggests that ADHD, both in children and adults, is a syndrome, not a biologically distinct disease. This conclusion is supported by high comorbidity, a variable course, and a variable response to treatment [25]. These variations might best be viewed as identifying sub-groups rather than additional diagnoses.

Poor diagnostic practices

a*)* Failure to consider the differential diagnosis

Attention is a core cognitive function that can be affected by many mental disorders [26]. ADHD is only one of these conditions, and DSM-5 [12] lists several that need to be considered in the differential diagnosis of adult patients: anxiety disorders, depressive disorders, bipolar disorder, substance use disorders, intermittent explosive disorder, stereotypic movement disorder, autism spectrum

disorders, specific learning disorders, intellectual disability, and personality disorders.

Moreover the comorbidity of adult ADHD is broad. The most comprehensive study [27] found high levels of mood disorders, anxiety disorders, substance use disorders, eating disorders, and personality disorders. There is little data on how these comorbidities impact on response to long-term pharmacological treatment. Failure to differentiate ADHD from other disorders and the treatment of ADHD without regard to comorbidity could reduce or negate treatment benefits, though little is known about the association between comorbidities and outcomes in adult ADHD.

b) Failing to apply the criterion for a childhood onset

DSM-5 [12] requires that ADHD in adults begin in childhood: inattentive or hyperactive-impulsive symptoms must have been present before age 12. This revised age requirement somewhat widens the diagnostic criteria; DSM-IV required an onset prior to age 7. However, one cannot have adult ADHD without first having childhood ADHD.

Confirming the presence of a childhood diagnosis in adult patients on the basis of long-term recall is not a valid procedure. It is well known that memories of past problems are strongly colored by present symptomatology [28]. Thus, adult patients with symptoms may claim that they had the same problems with

attention during childhood, but that they were not recognized. Given the high level of interest in diagnosis over the last several decades, however, this may not be very likely. Another problem is that when a child is diagnosed with ADHD, parents may assume that they have the same disorder, even if they have never been diagnosed with it. This is also unlikely: mental disorders have a complex inheritance, and the best estimate of heritability for adult ADHD is 30-40% [29] .

One way to improve validity for assessing childhood onset is to obtain collateral information, e.g., from parents. It is probably even more important to examine school records to determine what teachers observed, and to show that symptoms caused functional impairment in the school environment [11]. Finally, one can attempt to determine whether patients were assessed and treated for ADHD as children, and whether they had a clear response to therapy.

Since all of these methods are limited by recall bias, childhood symptoms should be assessed using multiple methods. In the absence of a gold standard, the diagnosis of ADHD requires a higher threshold. The failure to do so could easily lead clinicians to misdiagnose other problems as ADHD or diagnose ADHD when there is no mental disorder.

c) Relying on screening tools and psychological assessments

Screening questionnaires and rating scales are often used to validate a clinical diagnosis of adult ADHD. However, screening tools are designed to cast a

wide net in order to identify patients who might benefit from professional assessment. By design, they have a built-in, high false positive rate [30]. Since only a proportion of those who are identified as possible cases by a screening test actually meet diagnostic criteria, these tools cannot, by themselves, be relied on to validate a diagnosis. Thus, although the Connors checklist [31] is a convenient screener for non-professionals, it should not be used as a validator of diagnosis.

The same limitations apply to psychological testing. These procedures, which use psychometrically tested instruments and provide more detail than clinical assessments, can be used as one element in a comprehensive assessment, but tend to be expensive in practice. Most, including the popular Continuous Performance Test [32], lack specificity, meaning that, like screening tools, they cast the net too wide for the purpose of diagnosis. In the absence of a clear understanding of endophenotypes, psychological testing cannot provide a gold standard.

3) *Overestimating treatment benefits among patients treated in practice*

Clinical trials and meta-analyses show that there can be benefits from treating patients who meet criteria for adult ADHD with stimulants [31-35]. However, no long-term studies have been conducted [32]. It is also not known whether results obtained in randomized trials translate into effectiveness in broader clinical populations. Also, while stimulants seem to be relatively safe drugs [37],

there are no studies examining risk when adults take them over many years.

While it was once thought that a paradoxically calming effect from stimulants supports a diagnosis of ADHD, these agents can increase attention and focus in normal people [38]. Thus since stimulant responses are nonspecific, they are diagnostically uninformative. Moreover, since many report a subjective experience that does not correspond to results of formal testing [39], one must consider the possibility that placebo responses could be more common in clinical practice than in formal trials. Thus, one cannot use response to these drugs as a validator of the diagnosis.

4) Non-medical benefit seeking

a) Medicalizing attention

Society increasingly demands a high level of performance on tasks that require sustained attention and multitasking [14]. Thus, social forces, such as competition in school settings, can motivate patients to seek stimulant prescriptions, which in turn require a diagnosis of ADHD. Indeed, it is well-established that stimulants are being passed from one person to another outside of the medical system [40].

Many symptoms of adult ADHD show only subtle differences from normal features of acceptable young adult behavior [41]. ADHD, like many other mental disorders, can be understood as a set of traits that are continuous with normality.

As with any trait, one sees a range of normal variation, in which higher levels are consistent with good functioning in some environments, while lower levels are consistent with functioning in other situations. High levels of activity and attention are needed for tasks requiring a rapid response, but are dysfunctional when performing tasks that require persistence and patience. These variations in requirements for attention are likely to be socially and culturally relative.

The prevalence of ADHD in children shows a striking variance across cultures [23]. It is most frequently diagnosed in North America, is less prevalent in many parts of Europe, and is rarely identified in developing countries. This disparity has been interpreted as reflecting the failure of physicians in other countries to identify the disorder [19]. Alternatively, real differences in prevalence could depend on the nature of sociocultural demands, or on genetic differences between populations.

b) Disability benefits

Receiving a diagnosis of ADHD may make it possible for some adults to be considered disabled, and to receive benefits. Although the data supporting this conclusion is sparse, it is not uncommon for university students to receive extra time for papers or even double time for completing examinations if they are diagnosed either with a learning disability or with ADHD [42].

5) Benefits to non-patient stakeholders

Researchers have a tendency to over-estimate the prevalence of clinical disorders to justify requests for funding. They are likely to claim that a condition is much more common than generally recognized, but is current being undertreated. This may well have been the case for adult ADHD.

Also, it may not be coincidental that increased diagnosis coincided with the marketing of new stimulants [17]. The diagnosis of adult ADHD has been actively promoted by the pharmaceutical industry, with gratifying results for their business model. Community groups, some of which receive funding from pharmaceutical companies that make stimulants, also promote increased diagnosis and pharmacological treatment. This may help account for rises in the prescription of stimulants in adult clinical populations[44].

6) *Modern culture and medicalization*

We live in an era in which normal life problems are increasingly medicalized. Information available on the internet may have made this problem even more widespread. The use of stimulants to increase performance in people who do not have a mental disorder could be an example of cognitive enhancement through the use of "cosmetic psychopharmacology" [45].

The Need for a More Cautious Diagnosis of Adult ADHD

The increase in the prevalence of adult ADHD reflects the effects of many forces. Physicians are faced with complex clinical problems for which a simple solution, leading directly to a prescription, is a tempting option.

The absence of objective measures for the diagnosis of adult ADHD suggests a need for caution, as well as a more systematic approach using self-report, clinical interviews, collateral information, childhood documentation, and when available, neuropsychological testing. Given that this kind of assessment is unlikely to happen outside of research clinics or private clinics, clinicians should at least require collateral information and solid evidence for a childhood onset. We suggest even more caution when this data is absent or unavailable.

The main concern about over-diagnosis is over-treatment. More research is needed on the impact of increased stimulant prescription on adult patients receiving a treatment that can be maintained for years or decades, a period of time that has not yet been examined in research[45].

It might be argued that even if stimulant treatment is given to normal people, it need not be withheld if it is effective in improving performance. However as long as there is little long-term follow-up research to determine the effects of administration of these drugs over years, clinicians should be cautious.

The question is whether stimulants are being prescribed to increase attention and focus in people with other diagnoses, or with no diagnosis. Since

clinical trials focus on the short-term treatment of classical cases of ADHD, research has not yet been able to provide an answer.

Acknowledgements:

The authors have no conflict of interests to declare.

References

References

1. Moynihan R, Doust J, Henry D (2012). Preventing over-diagnosis: how to stop harming the healthy. *BMJ*; 344:e3502.
2. Welch HG, Schwartz L, Woloshin S (2011). *Overdiagnosed: Making people sick in the pursuit of health.* Boston, Beacon Press
3. Welch HG, Frankel BA (2011). Likelihood that a woman with screen-detected breast cancer has had her "life saved" by that screening. *Arch Intern Med.* 171:2043-2046.
4. Welch HG, Black WC (2010). Over-diagnosis in cancer. *J Nat Cancer Institute.* 102:605-613.
5. Weyers W (2012). The 'epidemic' of melanoma between under- and over-

diagnosis. *Journal of Cutaneous Pathology*.;39:9-16.

6. Black WC (1998): Advances in radiology and the real versus apparent effects of early diagnosis. *European journal of Radiology.* 1998;27:116-122.

7. Davies L, Welch HG (2006). Increasing incidence of thyroid cancer in the United States, 1973-2002. *JAMA: the journal of the American Medical Association.* 295:2164-2167.

8. Moffitt, TE, Caspi, A, Taylor, A, Kokaua, J. (2009): How common are common mental disorders? Evidence that lifetime prevalence rates are doubled by prospective versus retrospective ascertainment. *Psychological Medicine* 40:899–909.

9. Paris, J (2013): *The Intelligent Clinician's Guide to DSM-5*. New York, Oxford University Press

10. Lange, KW, Reichl., S, Lange, KM, Tucha, L, Tucha, O (2010): The history of attention deficit hyperactivity disorder. Atten Def Hyp Disord 2:241–255

11. Hechtman, L. (2011): Prospective follow-up studies of ADHD: helping establish a valid diagnosis in adults. *J Amer Acad Child Adolesc Psychiatry* 50: 533-536.

12. American Psychiatric Association. (2013): *Diagnostic and Statistical Manual of Mental Disorders*, (5th ed.) Washington, DC, American Psychiatric Publishing

13. Kessler, RC, Adler, L, Barkley, R, Biederman, J, Conners, CK. (2006): The prevalence and correlates of adult ADHD in the United States: Results from the National Comorbidity Survey replication. *Amer J Psychiatry*, 163: 716–723.

14. Batstra, L, Frances, AJ. (2012): DSM-5 further inflates Attention Deficit Hyperactivity Disorder. *J Nerv Ment Dis.* 200: 486–488.

15) Asherson, P, Moncrieff, J, Timini, S (2010): Is ADHD a valid diagnosis in adults? *BMJ*; 340: 736-737

16. Singh, I (2008): Beyond polemics: science and ethics of ADHD. *Nature Reviews*, *Neuroscience* 9: 957-963

17. Simon, V, Czobor, P, Bálint, S, Mészáros A, Bitter, I (2009): Prevalence and correlates of adult attention-deficit hyperactivity disorder: meta-analysis *BJP*, 194:204-211

18. Sciutto MJ, Eisenberg M (2007). Evaluating the evidence for and against the over-diagnosis of ADHD. *J Attention Disorders.* 11:106-113.

19. Faraone SV, Sergeant J, Gillberg C, Biederman J (2000): The worldwide prevalence of Attention Deficit Hyperactivity Disorder. J *Amer Acad Child Adolesc Psychiatry*; 39:182–193

20. Zimmerman, M, Galione, J. (2010): Psychiatrists' and nonpsychiatrist physicians' reported use of the DSM-IV Criteria for major depressive

disorder. *J Clin Psychiatry*. 71:235–238

21. Zimmerman, M., Galione, J.N., Ruggero, C.J., Chelminski, I., Young, D: Dalrymple, K., & McGlinchey, J.B. (2010): Screening for bipolar disorder and finding borderline personality disorder. *J Clin Psychiatry*, 71, 1212-1217

22. *Olfson, M, Blanco, C, Wang, S, Greenhill, LL (2013): Trends in office-based treatment of adults with stimulants in the United States.* Journal of Clinical Psychiatry 74:43-50

23. McCarthy S, Wilton L, Murray ML, Hodgkins P, Asherson P, Wong CK. (2012): The epidemiology of pharmacologically treated attention deficit disorder in children, adolescents and adults in UK primary care. BMC Pediatrics;12:78.

24. Leung, AK, Lemay, JF. (2003): Attention deficit hyperactivity disorder: an update. *Advances Therapeutics,* 20:305–318.

25. Bishop, D. V. M. & Rutter, M. L. (2008). Neurodevelopmental disorders: conceptual approaches. In M. Rutter, D. Bishop, D. Pine, S. Scott , J. Stevenson, E. Taylor & A. Thapar (Eds.), *Rutter's Child and Adolescent Psychiatry* (pp. 32-41). Oxford: Blackwell

26. Posner, MI (2012): Attentional Networks and Consciousness. *Frontiers in Psychology* 3: 64-70

27. Cumyn L, French L, Hechtman L (2009). Comorbidity in adults with attention-deficit hyperactivity disorder. *Canad J Psychiatry 54*:673-683.

28. Schacter, D.L. (1996). *Searching for Memory.* New York: Basic

29. The genetics of attention deficit/hyperactivity disorder in adults, a review

Molecular Psychiatry (2012) **17,** 960–987; doi:10.1038/mp.2011.138;

30. Woods, SP, Lovejoy, DW, Ball, JD (2002): Neuropsychological characteristics of adults with ADHD: a comprehensive review of initial studies. *Clin Neuropsychol*; 16:12-34

31. Conners, C, March, J, Erhardt, D, Butcher, T. (1996). Assessment of attention-deficit disorders. *J Psychoed Assessment*, 32:186-205.

32. McGee, RA, Clark, SE, Symons, DK (2000): Does the Conners' Continuous Performance Test aid in ADHD diagnosis? *J Abnorm Child Psychol* 28:415–424

31. Wilens, TE, Morrison, NR Prince, J: (2011); An update on the pharmacotherapy of attention-deficit/hyperactivity disorder in adults. *Expert Rev Neurother. 11, 1443–1465.*

32. Castellas, X, Ramos-Quiroga, JA, Bosch, R, Nogueira, M, , Casa, M (2011): Amphetamines for Attention Deficit Hyperactivity Disorder (ADHD) in adults Cochrane Developmental, Psychosocial and Learning Problems Group

DOI: 10.1002/14651858.CD007813.pub2

33. Kooij SJ, Bejerot S, Blackwell A (2010). European consensus statement on diagnosis and treatment of adult ADHD: The European Network Adult ADHD. *BMC Psychiatry.*;10:67.

34. Mészáros, M, Czobor, P, Bálint, S, Komlósi, S, Bitte, I (2009): Pharmacotherapy of adult ADHD: a meta-analysis. *Int J of Neuropsychopharmacology*

35. Surman, CBH, Hammerness, PG, Pion, K, Faraone, SV (2013): Do stimulants improve functioning in adults with ADHD?: A review of the literature. *European Neuropsychopharmacology* 23, 528–533

37. Franke, B, Faraone, SV, Asheron, P. Buitelaar, J, Bau, CHD, Ramous-Quiroga, JA (2012): Long-term efficacy and safety of treatment with stimulants and atomoxetine in adult ADHD: A review of controlled and naturalistic studies. *European Neuropsychopharmacology.* DOI: 10.1016/j.euroneuro.2012.07.

38. Rapoport, JL, Buchsbaum, MS, Zahn, TP, Weingartner, H, Ludlow, C, Mikkelsen EJ (1978): Dextroamphetamine: cognitive and behavioral effects in normal prepubertal boys. *Science*, 199: 560–563.

39. Smith ME, Farah MJ (2011). Are prescription stimulants "smart pills"? The epidemiology and cognitive neuroscience of prescription stimulant use by normal healthy individuals. *Psychol Bull.*;137:717.

40. Wilens TE, Adler LA, Adams J (2008). Misuse and diversion of stimulants prescribed for ADHD: a systematic review of the literature. *J Amer Acad Child Adolesc Psychiatry.* 47:21-31.

41. Shah, PJ, Morton, MJS (2013): Adults with attention-deficit hyperactivity

disorder - diagnosis or normality? *Brit J Psychiatry* 203: 317-319

42. Lewandowsi, L, Cohen, J, Lovett, BJ (2013): Effects of extended time allotments on Reading Comprehension Performance of College Students With and Without Learning Disabilities Journal of *Psychoeducational Assessment* **31,** 326-336

43. Conrad, P. Potter, D (2000): From hyperactive children to ADHD adults, Observations on the expansion of medical categories, Social Problems, 47, 559-582

44. Greely, H, Campbell, P, Sahakian, B, Harris, J, Kessler, RC (2008): Towards responsible use of cognitive-enhancing drugs by the healthy Nature, http://dx.doi.org/10.1038/456702a

45. Thomas, R, Mitchellm, GK, Batstra, L (2013): Attention-deficit/hyperactivity disorder: are we helping or harming? BMJ 347:f6172 doi:10.1136/bmj.f6172

Olfson, M, Blanco, C, Wang, S, Greenhill, LL (2013): Trends in office-based treatment of adults with stimulants in the United States. Journal of Clinical Psychiatry 74:43-50