

Review of literature of attention-deficit/hyperactivity disorder with comorbid eating disorders

Revisão da literatura sobre a comorbidade do transtorno do déficit de atenção e hiperatividade com transtornos alimentares

Bruno Palazzo Nazar,^{1,2,4} Camilla Moreira de Sousa Pinna,^{1,3} Gabriel Coutinho,^{1,2}
Daniel Segenreich,^{1,2} Monica Duchesne,^{2,4} José Carlos Appolinario,^{2,4,5} Paulo Mattos^{1,5}

Abstract

Objective: According to studies of prevalence, up to 70% of adults with attention-deficit hyperactivity disorder have at least one psychiatric comorbidity, which leads to diagnostic and therapeutic difficulties as well as more severe functional impairment. There is a paucity of data on the comorbidity of attention-deficit hyperactivity disorder and eating disorders. The objective of this study was to review the literature regarding the attention-deficit hyperactivity disorder/eating disorders comorbidity, performing a critical analysis of relevant data. **Method:** Articles in Medline, Lilacs, SciELO, ISI and PsycINFO databases from 1980 up to 2008, were searched. The references from the articles were used as additional sources of data. **Results:** Fourteen articles were found: five prevalence studies, four case reports, three case-control studies, one symptom-assessment study of attention-deficit hyperactivity disorder and eating disorders, and one article regarding possible causes of the association between attention-deficit hyperactivity disorder and eating disorders. These articles suggested that adult women with attention-deficit hyperactivity disorder are at higher risk of developing eating disorders, especially bulimia nervosa. Bulimia Nervosa rates found in attention-deficit hyperactivity disorder groups ranged from 1% to 12%, versus 0% to 2% in control groups. **Conclusions:** Although there seems to be a relationship between attention-deficit hyperactivity disorder and eating disorders, the reduced number of studies available, with various methodologies, and small sample sizes limit the generalization of the findings.

Descriptors: Eating disorders; Bulimia nervosa; Attention deficit disorder with hyperactivity; Comorbidity; Impulsivity

Resumo

Objetivo: De acordo com os estudos de prevalência de comorbidades, até 70% dos adultos com transtorno do déficit de atenção e hiperatividade apresentam pelo menos uma comorbidade psiquiátrica, ocasionando dificuldades diagnósticas e terapêuticas, bem como um maior prejuízo funcional. Existem poucos estudos sobre a comorbidade entre transtorno do déficit de atenção e hiperatividade e transtornos alimentares. O objetivo deste estudo foi realizar uma revisão da literatura sobre a comorbidade transtorno do déficit de atenção e hiperatividade/transtornos alimentares, realizando uma análise crítica dos dados encontrados. **Método:** Procedeu-se a uma revisão sistemática da literatura por meio de pesquisa bibliográfica de artigos publicados no período de 1980 a 2008, utilizando as bases de dados Medline, Lilacs, SciELO, ISI e PsycINFO. **Resultados:** Foram identificados 14 artigos, sendo cinco estudos de prevalência de comorbidades, quatro relatos de casos, três estudos caso-controle, um estudo de avaliação de sintomas de transtorno do déficit de atenção e hiperatividade e de transtornos alimentares e um sobre as possíveis causas da associação entre transtorno do déficit de atenção e hiperatividade e transtornos alimentares. Os artigos identificados evidenciaram maior risco de desenvolvimento de transtornos alimentares, especialmente bulimia nervosa, em mulheres portadoras de transtorno do déficit de atenção e hiperatividade. As taxas de bulimia nervosa encontradas nos grupos com transtorno do déficit de atenção e hiperatividade variaram de 1% a 12%, enquanto que no grupo controle foram de 0% a 2%. **Conclusões:** Embora pareça existir uma relação entre transtorno do déficit de atenção e hiperatividade e transtornos alimentares, a escassez de trabalhos existentes, com metodologias variadas e pequenas amostras avaliadas não permitem a generalização dos resultados apresentados.

Descritores: Transtornos alimentares; Bulimia nervosa; Transtorno da falta de atenção com hiperatividade; Comorbidade; Impulsividade

¹ Attention-Deficit Study Group (GEDA), Institute of Psychiatry (IPUB), Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro (RJ), Brazil

² Post-Graduate Program in Psychiatry and Mental Health, Institute of Psychiatry (IPUB), Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro (RJ), Brazil

³ Medical Residency Program in Psychiatry, Institute of Psychiatry (IPUB), Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro (RJ), Brazil

⁴ Group of Obesity and Eating Disorders (GOTA), State Institute of Diabetes and Endocrinology (IEDE), Institute of Psychiatry (IPUB), Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro (RJ), Brazil

⁵ Psychiatry and Mental Health, Institute of Psychiatry (IPUB), Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro (RJ), Brazil

Correspondence

Bruno Palazzo Nazar
Rua Visconde de Albuquerque, 1400 - 101 - Leblon
22450-000 Rio de Janeiro, RJ, Brazil
Phone/fax: (+55 21) 3204-1698
E-mail: bruno.nazar@gmail.com.br

Introduction

Attention-deficit/hyperactivity disorder (ADHD) in adults is characterized by symptoms of inattention, restlessness and impulsivity.¹ A recent epidemiological study showed a prevalence of up to 4.4% among North-American adults.²

Eating disorders (ED), according to the Diagnostic and Statistical Manual of Mental Disorders - 4th edition (DSM-IV)³ include anorexia nervosa (AN), bulimia nervosa (BN), and binge-eating disorder (BED). The core features of AN are a refusal to maintain body weight on a minimal normal range adequate for age and height, fear of putting on weight, body image distortion, and amenorrhea. BN individuals experience binge eating episodes and submit themselves to inadequate compensatory methods to prevent weight gain, such as self-induced vomiting and abuse of laxatives. BED is listed on appendix B of DSM-IV, and exhibits binge eating episodes without the occurrence of compensatory methods. These binge eating episodes are followed by intense feelings of shame and guilt.³⁻⁵ Prevalence rates in women from the general population for AN, BN, and BED are 0.9%, 1.5%, and 3.5%, respectively.⁶

Patients with ADHD and ED share common features, such as varied degrees of impulsivity, low self-esteem and a neuropsychological profile including deficits in attention and executive functions.⁷⁻⁹

Up to 70% of adults with ADHD present at least one comorbid psychiatric disorder,¹⁰ which not only imposes diagnostic and therapeutic challenges, but also increases interpersonal and occupational distress.¹¹ The most frequent comorbid diagnoses are mood disorders, anxiety disorders, and substance abuse. The majority of studies that assessed comorbidity profiles in ADHD adults did not evaluate the presence of EDs.

This current paper aimed to conduct a review of studies which evaluated the comorbidity between ADHD and ED.

Method

We conducted a bibliographic research of articles investigating the comorbidity between ADHD and ED, published between 1980 and 2008, either in English, French, Spanish or Portuguese. Articles were searched on Medline, Lilacs, PsycINFO, ISI, and SciELO databases, with the following keywords: "eating disorder", "binge", "binge eating disorder", "bulimia", "bulimia nervosa", "anorexia", "anorexia nervosa", and "obesity" x "attention deficit hyperactivity disorder", "ADHD", "ADD", "hyperkinetic disorder", and "attention". Relevant studies in the references of the articles were also obtained.

Results

Search results are listed on Table 1. Fourteen articles assessing ADHD and ED were identified, and classified in three categories, as follows:

1. ADHD in ED patients

Sokol et al. reported two cases of patients with comorbid BN, ADHD, and cluster B personality disorder who were treated with methylphenidate (MPH).¹² The first patient was 20 years old with a diagnosis of histrionic/borderline personality disorder. She started taking MPH 20 mg/day, and presented remission of binge-eating episodes and purging by self-induced vomiting, along with improvement of ADHD symptoms. Symptomatic improvement was evaluated by clinical interview, by a decreased score in the Conners scale,¹³ and by the Eating Attitudes Test (EAT).¹⁴ The second case reported was of a 38-year-old patient diagnosed with BN for over 20 years, with comorbid borderline personality disorder,

major depressive disorder, and generalized anxiety disorder. She had already used several antidepressants and was undergoing psychotherapy for many years. Her previous treatments improved her social functioning, anxiety, and depressive symptoms, but had shown only slight effects on binge-eating episodes, purging, and ADHD symptoms. The patient showed partial remission of BN symptoms and a decrease in impulsivity and ADHD symptoms after starting MPH 15 mg/day. Her score in the Conners Scale decreased from 34 to 13. The author suggested the possibility of using psychostimulants in refractory cases of BN comorbid with cluster B personality disorder.¹²

In the same article, the authors described a pilot case-control study for a retrospective evaluation of childhood ADHD symptoms on individuals with comorbid BN and cluster B personality disorder versus a control group with no psychiatric diagnosis, using the Conners Scale. Interviews were conducted on six BN patients and on seven control subjects (medical students). BN patients presented significantly higher Conners Scale scores than the control group (25.3 ± 4 vs. 16.8 ± 2.4 , $p = 0.02$). Authors suggested that BN women with comorbid cluster B personality disorder presented higher prevalence of ADHD than the comparison group.¹²

Wentz et al. conducted a pilot study which evaluated the presence of developmental disorders (ADHD, Pervasive Development Disorders, and Tourette's Disorder) in a sample of 30 patients diagnosed with either AN or BN. Patients were evaluated with specific semi-structured interviews for each of these disorders, according to DSM-IV criteria. Seventeen percent ($n = 5$) of patients met criteria for childhood ADHD, and 10.2% ($n = 3$) of patients met criteria for childhood and adult ADHD. All the patients diagnosed with ADHD presented AN, purging type.¹⁵ Unfortunately, comorbidity with other psychiatric disorders was not evaluated, nor was a control group included in the study.

2. ED in ADHD patients

Mattos et al. conducted a pioneer study investigating ED prevalence in a Brazilian clinical sample of 86 self-referred treatment-naïve adults with ADHD. The patients were sequentially recruited and evaluated with semi-structured interviews. The prevalence of ED found was 10.4%, of which 77% presented BED and 23% BN. The authors compared the socio-demographic and clinical profiles of the patients presenting comorbid ADHD-ED with the patients with ADHD only, and found a higher number of comorbidities in the first group ($p = 0.02$).¹⁶

Kooij et al. described the psychiatric comorbidity profile in a sample of 45 adults with ADHD using semi-structured interviews. The BN rate found was 9% ($n = 3$); two patients had current diagnosis and one patient a past diagnosis.¹⁷

Sobanski et al. evaluated the psychiatric comorbidity profile and functional impairment of 70 adults with ADHD using semi-structured interviews. The prevalence of ED found was 11.4% ($n = 8$). However, authors did not specify which ED was found, only pointing out that ED with compulsive features were more prevalent than ED with restrictive features.¹⁸

Mikami et al. evaluated sociodemographic variables and comorbid diagnoses, including EDs, in 228 girls through a 5-year longitudinal study.¹⁹ The baseline sample included 93 girls with ADHD-C (combined type), 47 girls with ADHD-I (inattentive type), and 88 controls. This was the first study to divide ADHD subjects by subtypes. Subjects were interviewed with the Diagnostic Interview Schedule for Children - 4th edition (DISC-IV),²⁰ and had the Child Behavior Checklist (CBCL),²¹ the Swanson, Nolan, and Pelham

Table 1 – Descriptions of studies found on the subject “ED comorbid with ADHD”

Authors	Types of study	ADHD/ED diagnosis	Diagnostic instruments	Results	Comments
Schweickert et al., 1997	Case report	Clinical diagnosis of ADHD and ED	Clinical Interview	One patient with BN and ADHD treated with MPH – symptomatic improvement in both disorders	
Sokol et al., 1999	Case report	Clinical diagnosis of ED + evaluation of ADHD symptoms	Clinical Interview + Conners Rating Scale (ADHD)	Two patients with BN and ADHD symptoms in childhood were successfully treated with MPH	The patients had cluster B personality disorder
Drimmer, 2003	Case report	Clinical diagnosis of ADHD and ED	Clinical Interview based on DSM-IV criteria – no structured interview	Two cases of ADHD and BN and one case of BN only treated successfully with psychostimulants as monotherapy	
Mattos et al., 2004	Prevalence study on ED in patients with ADHD	Clinical diagnosis of ADHD and ED	K-SADS-PL module for ADHD + SCID-DSM IV	Increased prevalence of ED, with predominance of BED	Adult clinical sample (n = 86)
Kooij et al., 2004	ADHD patients comorbidities prevalence study	Clinical diagnosis of ADHD and ED	CIDI-2.1 and ASRS-18	Increased prevalence of BN	Adult clinical sample (n = 45)
Dukarm, 2005	Case report	Clinical diagnosis of ADHD and ED	Clinical Interview based on DSM-IV criteria – no structured interview	Six cases of BN with ADHD treated successfully with psychostimulants	
Agranath-Meged et al., 2005	Prevalence study on ADHD and ED in morbidly obese children and adolescents	Clinical diagnosis of ADHD and ED	Checklist of ED symptoms (based on DSM-IV) + K-SADS-PLT module for ADHD + Conners Rating Scale	Increased prevalence of ADHD with no cases of ED	Clinical sample – hospitalized inpatients of pediatric clinics (n = 26)
Wentz et al., 2005	Prevalence study of development disorders in patients with ED	Clinical diagnosis of ADHD and ED	SCID-IV module for ED + ASRS-18 + ASDI-Interview + TSSL	Increased prevalence of ADHD in patients with AN, purging type	Combined clinical sample of inpatients and outpatients (n = 30)
Surnam et al., 2006	Retrospective case-control study	Clinical diagnosis of ADHD and ED	Adults: SCID-DSM III-R + K-SADS-E module for ADHD Children and adolescents: K-SADS-E	Increased prevalence of BN in females with ADHD	Clinical sample Pediatric ADHD sample (n = 280) x Pediatric control sample (n = 242) Adult ADHD sample (n = 320) x Adult control sample (n = 422)
Cortese et al., 2007	Cross-sectional study of ADHD and BN symptoms	No diagnosis was made, only evaluation of symptoms	BITE, BDI, STAI, and Conners Rating Scale	Obese patients with bulimic behaviors presented more ADHD symptoms	Clinical sample of morbidly obese adolescents (n = 99)
Biederman et al., 2007	A 5-year prospective case-control study	Clinical diagnosis of ADHD and ED	Adults: SCID-DSM III-R + K-SADS-E module for ADHD Children and adolescents: K-SADS-E	ADHD females were 3.6 times more likely to meet criteria for an ED. Women with ADHD/ED presented with more comorbidities	Clinical sample of women with ADHD (n = 123) x Control female sample (n = 112)
Sobanski et al., 2007	Adult ADHD comorbidities prevalence study	Clinical diagnosis of ADHD and ED	SCID-DSM-IV Hypescheme (semi-structured interview based on DSM-IV and ICD-10 criteria) + WURS (reduced form) + Brown Scale	The prevalence of ED was 11.4% (n = 8)	Adult clinical sample (n = 70)
Mikami et al., 2008	Childhood and Adolescence ADHD 5-year longitudinal study	Clinical diagnosis of ADHD and ED	DISC-IV + CBCL + SNAP-IV + TFL + EDI-II		

ED = Eating disorder(s), AN = Anorexia nervosa, BN = Bulimia nervosa, BED = Binge eating disorder, ADHD = Attention-deficit hyperactivity disorder, MPH = Methylphenidate, DISC-IV = Diagnostic Interview Schedule for Children – 4th edition,²⁰ CBCL = Child Behavior Checklist,²¹ SNAP-IV = Swanson, Nolan, and Pelham Rating Scale - 4th edition,²² TRF = Teacher's Report Form,²³ EDI-II = Eating Disorders Inventory – II,²⁴ BITE = Bulimic Investigatory Test Edinburgh,³² BDI = Beck Depression Inventory,³³ STAI = State-Trait Anxiety Inventory,³⁴ K-SADS = Kiddie - Schedule for Affective Disorders and Schizophrenia,^{40,41} SCID-DSM-IV = Structured Clinical Interview for DSM-IV,⁴² CIDI- 2.1 = Composite International Diagnostic Interview, version 2.1,⁴³ ASRS-18 = ADHD Adult Self-Report Symptoms Rating scale,⁴⁴ ASDI = Asperger Syndrome Diagnostic Interview,⁴⁵ TSSL = Tourette Syndrome Symptom List,⁴⁶ WURS = Wender-Utah Rating Scale,⁴⁷ ICD-10 = International Statistical Classification of Diseases and Related Health Problems 10th Revision.

Rating Scale - 4th edition (SNAP-IV),²² and the Teacher's Report Form (TRF)²³ completed. All girls also completed the Eating Disorders Inventory - II (EDI-II)²⁴ at follow up. Girls with ADHD-C at baseline showed higher severity of eating pathology at follow-up than did controls; girls with ADHD-I were intermediate between these two groups. Baseline impulsivity symptoms, as opposed to hyperactivity and inattention, best predicted adolescent eating pathology. None of the girls in this study met clinical criteria for BN, perhaps because the mean age at follow up (14.2 years; range = 11-18) was below the peak for incidence of BN.¹⁹

3. Comorbidity ADHD-ED as the main focus

Schweickert et al. made the first clinical description of a patient presenting both ADHD and BN. They reported a 25-year-old patient that sought psychiatric treatment for BN presenting symptoms of inattention and impulsivity. She had had BN for over 12 years, accompanied by multiple substance abuse. She had already been diagnosed with ADHD as a child, being treated with MPH. The authors started treatment for ADHD with 15 mg/day of MPH which, while not presenting changes in the patient's appetite, promoted a complete remission in binge-eating episodes, as well as in purging by self-induced vomiting. Authors highlighted the importance of investigating the presence of ADHD in individuals presenting high levels of impulsivity.²⁵

Drimmer reported two adult women with comorbid ADHD and BN, according to DSM-IV criteria. Both did not respond to ED treatment with either SSRI, atypical antipsychotics, or psychotherapy, and were treated with psychostimulants. One of them was treated with MPH 20 mg/day for two years with partial but sustained response of the bulimic symptoms. The other used 20 mg/day of Adderall[®], and presented a significant improvement in her BN over 10 months. The author suggested that the noradrenergic and serotonergic agonist action of psychostimulants could be responsible for the reduction of BN symptoms in patients with or without comorbid ADHD.²⁶

Dukarm reported six cases of patients (four adult women and two adolescents, one male and one female) who met DSM-IV criteria for both ADHD and BN, all of whom were treated with dextroamphetamine. This was the first article ever to present this comorbidity in a male patient. All patients have shown reduction in bulimic symptoms using dextroamphetamine, with doses ranging from 30 to 45 mg/day.²⁷

Agranath-Meged et al. aimed to evaluate the prevalence of ADHD in a sample of morbidly obese children and adolescents hospitalized for treatment of obesity. The presence of ED was also investigated with semi-structured interviews. A total of 26 patients were evaluated, 13 male and 13 female, with ages ranging from 8 to 17 years (mean = 13.4 years), and body mass index (BMI) from 29 to 74 kg/m² (mean = 40.15 kg/m²). According to the authors, none of the patients met criteria for an ED diagnosis, and 57.7% were diagnosed as having ADHD.²⁸

Surnam et al. conducted a retrospective case-controlled study on four populations (two adult, n = 742 and two pediatric, n = 522) in order to evaluate BN rates among patients with ADHD, and in control subjects who had been selected from child psychiatry and pediatric clinics. The patients were from both genders and were evaluated with semi-structured interviews based on DSM-III-R criteria. BN prevalence for the pediatric ADHD group (n = 280), and for the pediatric control group (n = 242) were respectively 1% and 0%. The analysis of the two populations of adult women showed a BN prevalence of 11.2% (n = 124) among the ADHD group, and 2.0% (n = 191) for the control group. The findings

suggested that adult women with ADHD might present a higher risk of developing BN.²⁹ Moreover, Cortese et al. stated that there is preliminary evidence of an association of ADHD symptoms, binge eating episodes, and BMI, and that this should have been evaluated in the sample studied by Surnam.³⁰

In the same year, Cortese et al. evaluated the prevalence of ADHD symptoms and bulimic behaviors in a sample of morbidly obese adolescents from a pediatric clinic.³¹ Ninety-nine adolescents were evaluated (65 female and 34 male), with a mean age of 14.2 years and mean BMI of 37 kg/m². The patients completed the Bulimic Investigatory Test - Edinburgh (BITE),³² Beck Depression Inventory (BDI),³³ State-Trait Anxiety Inventory (STAI),³⁴ and the Conners scale for ADHD. A positive correlation was found between the scores in Conners and BITE scales. The authors suggested that adolescents with bulimic behaviors would have a high probability of presenting ADHD symptoms, independently of their anxiety and depression scores.³¹ Also in 2007, Cortese published an article discussing possible causes for the relationship between binge eating and ADHD, exploring clinical and neurobiological hypotheses.³⁵

Biederman et al. investigated the prevalence of ED in a sample of ADHD girls diagnosed with DSM-III-R, using a prospective case-controlled design. A group of 123 girls with ADHD was compared to a group of 112 control subjects from child psychiatric and pediatric clinics. After a five-year follow-up, the prevalence of ED was 16% (n = 20) in the ADHD group, and 5% (n = 6) in the control group. The ED found in the ADHD group were BN (n = 10); AN (n = 6), and eating disorders not-otherwise specified (EDNOS, n = 4). In the control group, the ED found were AN (50%, n = 3); BN (30%, n = 2), and EDNOS (20%, n = 1). The authors suggested that adolescents with ADHD present a higher risk of developing an ED, especially BN.³⁶

Discussion

The case-controlled studies found a higher prevalence of ED, especially BN, among ADHD individuals when compared to control groups. The BN rates found varied from 1% to 12% in ADHD groups, versus 0% to 2% in control groups.²⁹⁻³⁶

The study conducted by Biederman et al. identified cases of EDNOS consisting only of subclinical cases of BN and AN, without any cases of BED.³⁶ EDNOS consists of a heterogeneous group comprising AN, BN and BED cases that do not meet all DSM-IV-TR criteria. Many authors believe that BED should also be included in EDNOS category, since BED is listed in the appendix of the DSM-IV-TR. Although EDNOS and BED are the most frequent ED in clinical samples,³⁷ the case-controlled studies found BN to be more prevalent. Apparently, the studies by Surnam et al. and Biederman et al. did not evaluate the presence of BED.²⁹⁻³⁶ On the other hand, BED was the most common ED found in Mattos et al. study.¹⁶

Wentz et al. conducted the only study that evaluated the prevalence of ADHD among a sample of ED individuals. The authors evaluated patients who were on remission of ED, patients who were undergoing active outpatient treatment, patients who had been admitted at an inpatient unit, and also participants of a group therapy treatment for "multi-impulsive ED".¹⁵ EDNOS and BED diagnoses were not evaluated. Since patients with different profiles, impairments, and severity levels of illness were evaluated as one single group, analysis of the results should be cautiously considered. For example, authors stated that all patients diagnosed with ADHD also had a positive diagnosis of AN, purging type but no other characteristic (severity etc.) was mentioned. Therefore, this study could not clarify if the comorbidity ADHD-ED was associated

with a higher severity (and a worse prognosis of the ED).

Symptomatic improvements in bulimic patients with ADHD/ED comorbid with cluster B personality disorder by the use of psychostimulants should be cautiously understood, since the majority of studies did not use adequate rating scales to evaluate improvement. Sokol et al., were the only ones to use a rating scale to evaluate clinical improvement.¹² However, the authors used the EAT¹⁴ (designed to evaluate core AN symptoms), instead of the BITE scale³² (which better evaluates bulimic symptomatology). None of the articles used measures of global clinical improvement such as the CGI, or a rating scale that measures the severity of the ED. Also, there was no report of adverse effects experienced by these patients. Surprisingly, even Kooij et al.'s study – which evaluated the efficacy and safety of MPH – failed to describe the effects of this drug in the symptomatology of BN patients.¹⁷

Several controlled studies have demonstrated that binge eating episodes, purging methods, and other typical BN psychopathological symptoms can be successfully treated with interpersonal therapy, cognitive-behavioral therapy, and also with some antidepressants. However, some studies suggested that a lack of positive responses to conventional treatments would be better explained by a comorbid cluster B personality disorder combined with higher levels of impulsivity.³⁸ A possible hypothesis for the symptomatic improvement in bulimic patients with the use of psychostimulants would be that these patients comprise

a group where impulsivity played a major role for the occurrence of binge eating episodes. Therefore, psychostimulants would reduce global impulsivity levels and, consequently, reduce the number of occurrences of binge eating episodes. Controlled studies with adequate rating scales might clarify the potential therapeutic effects of psychostimulants in this group of patients.

Another important clinical concern is the possible misuse of psychostimulants by ED patients aiming to suppress their appetite. Such a concern is also present regarding psychostimulant misuse by ADHD patients with comorbid substance abuse. However, some studies suggested that ADHD treatment with psychostimulants creates a protective effect in the initial development of substance abuse, and even some clinical improvement in those who already exhibit the abuse.³⁹ This rationale could also be true for ADHD-ED patients, but more studies are needed to confirm this hypothesis.

Conclusion

Available studies suggest that adult women with ADHD have a higher risk of developing ED. However, there are only a few studies addressing this issue, and most of them with small samples and different methodologies, what might limit the generalizability of the results. More studies are needed in order to evaluate this comorbidity, as well as its clinical and therapeutic implications.

Disclosures

Writing group member	Employment	Research grant ¹	Other research grant or medical continuous education ²	Speakear's honoraria	Ownership interest	Consultant/ Advisory board	Other ³
Bruno Palazzzo Nazar	IPUB-UFRJ GOTA-IEDE	Janssen-Cilag Farmacéutica*	---	---	---	---	---
Camilla Pinna	IPUB-UFRJ	---	---	---	---	---	---
Gabriel Coutinho	IPUB-UFRJ	---	---	---	---	---	---
Daniel Segenreich	IPUB-UFRJ	Janssen-Cilag Farmacéutica*	---	---	---	---	---
Monica Duchesne	GOTA-IEDE	---	---	---	---	---	---
José Carlos Appolinario	Janssen-Cilag Farmacéutica	---	---	---	---	---	---
Paulo Mattos	IPUB-UFRJ	Janssen-Cilag Farmacéutica*	---	---	---	---	---

* Modest

** Significant

*** Significant. Amounts given to the author's institution or to a colleague for research in which the author has participation, not directly to the author.

Note: IPUB-UFRJ = Institute of Psychiatry of the Universidade Estadual do Rio de Janeiro; GOTA-IEDE = Group of Obesity and Eating Disorders and State Institute of Diabetes and Endocrinology of the Institute of Psychiatry of the Universidade Federal do Rio de Janeiro.

For more information, see Instructions for authors.

References

- Mattos P, Palmini A, Salgado CA, Segenreich D, Grevet EH, Reis de Oliveira I, Rohde LA, Romano M, Louzã M, Belmonte-de-Abreu P, Prado Lima P. Consensus of specialists on the diagnosis of attention-deficit/hyperactivity disorder in adults. *Rev Psiq RS*. 2006;28:50-60.
- Kessler RC, Adler L, Barkley R, Biederman J, Conners CK, Demler O, Faraone SV, Greenhill LL, Howes MJ, Secnik K, Spencer T, Ustun TB, Walters EE, Zaslavsky AM. The prevalence and correlates of adult ADHD in the United States: results from the National Comorbidity Survey Replication. *Am J Psychiatry*. 2006;163(4):716-23.
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed. Washington (DC); 1994.
- Siqueira KS, Appolinario JC, Sichieri R. Relationship between binge-eating episodes and self-perception of body weight in a nonclinical sample of five Brazilian cities. *Rev Bras Psiquiatr*. 2005;27(4):290-4.
- Duchesne M, Appolinario JC, Rangé BP, Fandiño J, Moya T, Freitas SR. The use of a manual-driven group cognitive behavior therapy in a Brazilian sample of obese individuals with binge-eating disorder. *Rev Bras Psiquiatr*. 2007;29(1):23-5.
- Hudson JI, Hiripi E, Pope HG, Kessler RC. The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biol Psychiatry*. 2007 61(3):348-59.
- Duchesne M, Mattos P, Fontenelle LF, Veiga H, Rizo L, Appolinario JC. Neuropsicologia dos transtornos alimentares: revisão sistemática da literatura. *Rev Bras Psiquiatr*. 2004;26(2):107-17.
- Schoechlin C, Engel RR. Neuropsychological performance in adult attention-deficit hyperactivity disorder: Meta-analysis of empirical data. *Arch Clin Neuropsychol*. 2005;20(6):727-44.
- Brown TE. Toward an adequate understanding of attention deficit disorders. *Rev Bras Psiquiatr*. 2006;28(4):261-2.
- Murphy KR, Barkley RA, Bush T. Young adults with attention deficit hyperactivity disorder: subtype differences in comorbidity, educational, and clinical history. *J Nerv Ment Dis*. 2002;190(3):147-57.

11. Secnik K, Swensen A, Lage MJ. Comorbidities and costs of adult patients diagnosed with attention-deficit hyperactivity disorder. *Pharmacoeconomics*. 2005;23(1):93-102.
12. Sokol M, Gray NS, Goldstein A, Kaye WH. Methylphenidate treatment for bulimia nervosa associated with a cluster B personality disorder. *Int J Eat Disord*. 1999;25(2):233-7.
13. Conners CK. A teacher rating scale for use in drug studies with children. *Am J Psychiatry*. 1969;126(6):884-8.
14. Garner DM, Garfinkel PE. The eating attitudes test: an index of the symptoms of anorexia nervosa. *Psychol Med*. 1979;9(2):273-9.
15. Wentz E, Lacey JH, Waller G, Rastam M, Turk J, Gillberg C. Childhood onset neuropsychiatric disorders in adult eating disorder patients. A pilot study. *Eur Child Adolesc Psychiatry*. 2005;14(8):431-7.
16. Mattos P, Saboya E, Ayrão V, Segenreich D, Duchesne M, Coutinho G. [Comorbid eating disorders in a Brazilian attention-deficit/hyperactivity disorder adult clinical sample]. *Rev Bras Psiquiatr*. 2004;26(4):248-50.
17. Kooij JJ, Burger H, Boonstra AM, Van der Linden PD, Kalma LE, Buitelaar JK. Efficacy and safety of methylphenidate in 45 adults with attention deficit/hyperactivity disorder. A randomized placebo-controlled double-blind cross-over trial. *Psychol Med*. 2004;34(6):973-82.
18. Sobanski E, Brüggemann D, Alm B, Kern S, Deschner M, Schubert T, Philipsen A, Rietschel M. Psychiatric comorbidity and functional impairment in a clinically referred sample of adults with attention-deficit/hyperactivity disorder (ADHD). *Eur Arch Psychiatry Clin Neurosci*. 2007;257(7):371-7.
19. Mikami AY, Hinshaw SP, Patterson KA, Lee JC. Eating pathology among adolescent girls with attention-deficit/hyperactivity disorder. *J Abnorm Psychol*. 2008;117(1):225-35.
20. Shaffer D, Fisher P, Lucas CP, Dulcan MK, Schwab-Stone ME. NIMH Diagnostic Interview Schedule for Children, Version IV: description, differences from previous versions, and reliability of some common diagnoses. *J Am Acad Child Adolesc Psychiatry*. 2000;39:28-38.
21. Achenbach TM. *Manual for Child Behavior Checklist and Revised Child Behavior Profile*. Burlington (VT): University Associates in Psychiatry; 1991.
22. Swanson JM. *Assessment and treatment of ADD students*. Irvine (CA): K.C. Press; 1992.
23. Achenbach TM. *Manual for Teacher's Report Form and 1991 Profile*. Burlington (VT): University Associates in Psychiatry; 1991.
24. *Eating Disorder Inventory*. 2nd ed. Odessa (FL): Psychological Assessment Resources.
25. Schweickert LA, Strober M, Moskowitz A. Efficacy of methylphenidate in bulimia nervosa comorbid with attention-deficit hyperactivity disorder: a case report. *Int J Eat Disord*. 1997;21(3):299-301.
26. Drimmer EJ. Stimulant treatment of bulimia nervosa with and without attention-deficit disorder: three case reports. *Nutrition*. 2003;19(1):76-7.
27. Dukarm CP. Bulimia nervosa and attention-deficit hyperactivity disorder: a possible role for stimulant medication. *J Women's Health*. 2005;14(4):345-50.
28. Agranat-Meged AN, Deitcher C, Goldzweig G, Leibenson L, Stein M, Galili-Weisstub E. Childhood obesity and attention deficit/hyperactivity disorder: a newly described comorbidity in obese hospitalized children. *Int J Eat Disord*. 2005;37(4):357-9.
29. Surman CB, Randall ET, Biederman J. Association between attention-deficit/hyperactivity disorder and bulimia nervosa: analysis of 4 case-control studies. *J Clin Psychiatry*. 2006;67(3):351-4.
30. Cortese S, Isnard P, Dalla Bernardina B, Mouren MC. Attention-deficit/hyperactivity disorder, binge eating and obesity. *J Clin Psychiatry*. 2007;68(6):976.
31. Cortese S, Isnard P, Frelut ML, Michel G, Quantin L, Guedeney A, Falissard B, Acquaviva E, Dalla Bernardina B, Mouren MC. Association between symptoms of attention-deficit/hyperactivity disorder and bulimic behaviors in a clinical sample of severely obese adolescents. *Int J Obes*. 2007;31(2):340-6.
32. Henderson M, Freeman CPL. A self-rating scale for bulimia: the BITE. *Br J Psychiatry*. 1987;150:18-24.
33. Beck AT, Beamesderfer A. Assessment of depression: the depression inventory. *Mod Probl Pharmacopsychiatry*. 1974;7(0):151-69.
34. Spielberg CD, Gorsuch RL, Lushene RE. *Manual for the State-Trait Anxiety Inventory for children*. Palo Alto (CA): Consulting Psychologist Press; 1973.
35. Cortese S, Bernardina BD, Mouren MC. Attention-deficit/hyperactivity disorder (ADHD) and binge eating. *Nutr Rev*. 2007;65(9):404-11.
36. Biederman J, Ball SW, Monuteaux MC, Surman CB, Johnson JL, Zeitlin S. Are girls with ADHD at risk for eating disorders? Results from a controlled, five-year prospective study. *J Dev Behav Pediatr*. 2007;28(4):302-7.
37. Zimmerman M, Franchione-Witt C, Chelminski I, et al. Problems applying the DSM-IV Eating disorders Diagnostic Criteria in a general psychiatric outpatient practice. Proceedings of the 160th American Psychiatric Association Annual Meeting; 2007 May 19-24; San Diego, California. United States of America.
38. Keel PK, Mitchel JE. Outcome in bulimia nervosa. *Am J Psychiatry*. 1997;154(3):313-21.
39. Wilens TE. Does the medicating ADHD increase or decrease the risk for later substance abuse? *Rev Bras Psiquiatr*. 2003;25(3):127-8.
40. Endicott J, Spitzer RL. A diagnostic interview: the schedule for affective disorders and schizophrenia. *Arch Gen Psychiatry*. 1978;35(7):837-44.
41. Polanczyk GV, Eizirik M, Aranovich V, Denardin D, da Silva TL, da Conceição TV, Pianca TG, Rohde LA. Interrater agreement for the schedule for affective disorders and schizophrenia epidemiological version for school-age children (K-SADS-E). *Rev Bras Psiquiatr*. 2003;25(2):87-9.
42. First MB, Spitzer RL, Gibbon M, Williams JBW. *Structured Clinical Interview for DSM-IV Axis I Disorders – Patient Edition (SCID-I/P, Version 2.0, 4/97 revision)*. New York: Biometrics Research Department; 1997.
43. Robins LN, Wing J, Wittchen HU, Helzer JE, Babor TF, Burke J, Farmer A, Jablenski A, Pickens R, Regier DA. The Composite International Diagnostic Interview. An epidemiologic instrument suitable for use in conjunction with different diagnostic systems and in different cultures. *Archives of General Psychiatry*. 1988;45(12):1069-77.
44. Kessler RC, Adler L, Ames M, Demler O, Faraone S, Hiripi E, Howes MJ, Jin R, Secnik K, Spencer T, Ustun TB, Walters EE. The World Health Organization Adult ADHD Self-Report Scale (ASRS): a short screening scale for use in the general population. *Psychol Med*. 2005;35(2):245-6.
45. Gillberg C, Gillberg IC, Rastam M, Wentz E. The Asperger Syndrome (and High Functioning Autism) Diagnostic Interview (ASDI): a preliminary study of a new structured clinical interview. *Autism*. 2001;5(1):57-66.
46. Leckman JF, Towbin KE, Ort SI, Cohen DJ. Clinical Assessment of tic disorder severity. In: Cohen DJ, editor. *Tourette's syndrome and tic disorders*. New York: Wiley; 1988. p. 55-78.
47. Ward MF, Wender PH, Reimherr FW. The Wender Utah rating scale: an aid in the retrospective diagnosis of childhood attention deficit hyperactivity disorder. *Am J Psychiatry*. 1993;150(6):885-90. Erratum in: *Am J Psychiatry*. 1993;150(8):1280