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Prevalence and correlates of attention deficit hyperactivity disorder in obsessive-compulsive disorder patients

Lamis Ibrahim^{*}, Wail Abouhendy, Nelly Raafat and Amira Ahmed Fouad

Abstract

Background: High rates of history of childhood attention deficit hyperactivity disorder (ADHD) symptoms have been found in obsessive-compulsive disorder (OCD) adults. Both, when comorbid, cause the clinical course to be unfavorable, more susceptibility to substance use, and a bad response to treatment. We planned to assess the impact of childhood ADHD symptoms on OCD adults and the effect of this on clinical characteristics and comorbidities of the disorder.

Results: Our cross-sectional investigation uncovered that 44% of the OCD patients had childhood ADHD symptoms. Patients with childhood ADHD manifestations with at present grown-up ADHD had more elevated amounts of depression, anxiety, and impulsiveness. OCD patients with child ADHD symptoms but not continued symptoms till adulthood versus those without child ADHD symptoms had higher levels of depression, anxiety, and impulsiveness and more severe OCD symptoms.

Conclusion: ADHD in adults with OCD is associated with some features impairing the clinical picture including higher levels of anxiety, depression, and impulsiveness reflecting more chronic illness. A childhood history of ADHD symptoms, even if not continued till adulthood, caused more impulsiveness, more severe OCD symptoms, and more anxiety and depression comorbidity.

Keywords: OCD, ADHD, Anxiety, Impulsiveness, Depression

Background

Attention deficit hyperactivity disorder (ADHD) is described by a long-lasting pattern of hyperactivity and/or inattention and impulsivity. The ADHD symptoms interfere with an anticipated growing level and influence working and advancement and have proceeded to a degree that meddles with a foreseen developing level and affects scholarly, academic, and social or working accomplishments [1]. In a recent meta-analysis of 175 studies, the estimated overall worldwide pooled prevalence was 7.2% [2]. The prevalence is anticipated to increase with the new diagnostic criteria scheduled in the DSM-5 [1]. While the prevalence gets lower with age, the disorder continues into adulthood in about 40% of affected children [3].

The main features of obsessive-compulsive disorder (OCD) are the presence of compulsive and obsessive behaviors of significant length, greater than an hour per day, generating suffering and discomfort [1]. It appears to be difficult to suppress compulsions or obsessions in those affected with OCD often, although patients usually feel that their compulsions or obsessions are readily irrational [4].

Within the last years, multiple studies identified the comorbidity between ADHD and OCD in pediatric OCD samples [5]. Rates of comorbidities are highly varying, fluctuating from near 0 to 60% with lower comorbidity rates stated in adults relative to youth trials [6]. Higher degrees of ADHD symptoms have been recorded in OCD, with rates up to 30% of comorbid ADHD in adolescents and children [7]. As indicated by past investigations held among young people or youngsters with ADHD, close to zero to 7.5% have OCD [8]. The frequency of ADHD among OCD children or

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adolescents in other studies was stated to be above 20% [9]. Various studies held to assess OCD prevalence in adults with ADHD have found it to be about 1–13% [10]. Both disorders, when comorbid, cause the clinical course to be unfavorable, more susceptibility to substance use, and a bad response to treatment. So we have to diagnose and manage ADHD symptoms in OCD patients to improve the outcome of the disorder and patients' quality of life [9].

Objectives

- To explore childhood symptoms of ADHD in adult OCD patients who had never been diagnosed with ADHD during their childhood
- To compare the levels of impulsiveness, severity of depression, and anxiety between obsessive-compulsive adults having and not having childhood ADHD symptoms
- To compare the same parameters among those who had childhood symptoms of ADHD but not continued symptoms versus those who did not have symptoms since childhood

Methods

This study is a cross-sectional study. It was done at the Psychiatry Department, Zagazig University hospitals, during the period from February 2018 to February 2019.

Participants

One hundred OCD patients from both genders (aged 18–45 years), with DSM-5 diagnosis of OCD, who fulfilled the inclusion criteria were chosen from both the inpatient ward and the outpatient clinic by simple random sampling.

Study size

Assuming that the prevalence of childhood ADHD symptoms in OCD patients is 40% and the rate of admission is 240 cases/year, so the sample size is calculated by Epi Info 6 will be 100 patients (estimated according to confidence interval; C.I) with the a diagnosis of OCD who fulfill the inclusion criteria and will be recruited by systematic random sampling technique until the sample size is reached.

The study included patients of both genders who met DSM-5 criteria for OCD. Their ages ranged from 18 to 45 (in trial to avoid recall bias, also attention deficit symptoms diminished with aging). Full psychiatric examination was held to exclude patients with a history of any other psychiatric disorder.

Operational design

This study is a cross-sectional study. This study received ethical committee approval from the Department of Psychiatry, Zagazig University, and written informed consent was obtained.

We applied the following assessment procedures to all subjects:

1. General Medical Examination:

General medical examination of patients was done to exclude the presence of inflammation, severe physical disorders or Organic brain disease.

2. The Structured Clinical Interview for DSM-5 (SCID 5) to diagnose OCD [11]
3. *The Hamilton Depression Rating Scale (HDRS)*

Clinician-rated scale administrated in 20–30 min to assess the severity of, and change in, depressive symptoms in adults. The HDRS (known also as the HAMD) is considered the most worldwide used scale to assess depression. Seventeen items (HDRS17) form the original version referring to symptoms of depression experienced over the last week. The HDRS was used at first for hospital inpatients and so focus on physical and melancholic symptoms. Scoring varies by version. For the HDRS17, the normal range score is from 0 to 7 (or in clinical remission), a moderate severity score begins from 20 or higher [12]. We used the Arabic version [13].

4. *Hamilton Anxiety Rating Scale (HARS)*

It is a clinician-rated scale providing an analysis of anxiety severity. It is scored based on the rating of 40 individually assessed criteria. Scoring of each item based independently on a 5-point scale. Each question (statement) is answered using a Likert scale, the score of each statement ranges between 0 and 4, 0 refers to not present in the patient and 4 refers to very severe. A total score is calculated by the summation of each of the 14 items. This calculation will yield a comprehensive score in the range from 0 to 5 [14]. We used the Arabic version [15].

5. *Yale-Brown Obsessive-Compulsive Scale (Y-BOCS)*

This scale is utilized to rate the severity of (OCD) symptoms. This scale, which measures **compulsions** separately from obsessions, measures explicitly the symptoms' severity of obsessive-compulsive disorder but not being **biased** about compulsions or obsessions type. It is a self-rating scale containing 10-items; each

item rated from 0 to 4 according to the severity of symptoms, yielding a total possible scoring from 0 to 40. Questions ask about the time spent on obsessions, how much distress they have, and how much they can control thoughts. Compulsions are asked about the same questions. The results are analyzed according to the total score: sub-clinical scoring is from 0 to 7, mild is from 8 to 15, moderate is from 16 to 23, severe is from 24 to 31, and extreme is from 32 to 40 [16]. We used the Arabic version [17].

6. *Barratt Impulsiveness Scale, Version 11 (BIS-11)*

The current version of BIS-11 and its predecessors were developed to assess impulsivity. The BIS 11 looks at 3 domains of impulsivity: motor, planning, and attention impulsiveness. The BIS-11 is a self-rating questionnaire with 30 items scored ranging from 1 = rarely/never to 4 = almost always/always. The scoring (total impulsivity score) is as follows: 60–70 mild, 70–80 moderate, and if more than or equal 80 then impulsivity is severe. Administration time is not specified yet estimated to be 10–15 min. The test requires a fifth-grade reading level and is intended for individuals ages 8 and older [18]. We used the Arabic version [19].

7. *The Wender Utah Rating Scale for the retrospective assessment of symptoms of childhood ADHD*

The 61 questions were answered by the adult patient remembering his or her behavior during childhood with five possible answers scored from 0 to 4. The minimum score for 25 questions was 0 and the maximum score was 100. Forty-six refers to a cut-off score, 86 of the ADHD patients, 99 of the normal persons, and 81% of depressed individuals were classified correctly [20]. We used the Arabic version [21].

8. *The adult ADHD self-report scale Symptom Checklist*

It is an instrument including 18 criteria based on DSM-IV-TR. The most predictive symptoms of ADHD were found to be within six questions of the eighteen. Part A contained these six questions. The other 12 questions form Part B. If four or more marks appeared in the dark boxes of Part A, this indicates the patient's symptoms to be highly consistent with adult ADHD. Part B scoring can serve as a tool to further understand the patient's symptoms. The six questions consisting Part A are most predictive of the disorder [22]. We used the Arabic version [21].

After collecting data from all participants

Firstly, to find the frequency of childhood symptoms of ADHD in patients with OCD, among patients with childhood symptoms of ADHD, some with continued symptoms in adulthood, and those who did not, we compared them regarding the severity of depression, anxiety, levels of impulsiveness, and symptom severity.

Also, we compared the same parameters among those who had childhood symptoms of ADHD but not continued symptoms versus those who did not have symptoms since childhood. This was done to assess the effect of childhood symptoms of ADHD even if remitted in adulthood.

Statistical analysis

Statistical analyses were calculated using version 24 of IBM SPSS Statistics (IBM; Armonk, New York, USA).

Continuous variables were presented as mean \pm SD or median (range).

The presentation of categorical variables was by the frequency and percentage.

Levene's test checked homogeneity of variance.

Shapiro-Wilk test was used to check normality.

Independent samples *t* test is used to detect the difference between the means of two independent groups on a continuous dependent variable.

Chi-squared test of association can discover the relationship between two categorical variables.

P value (≤ 0.05) was considered a statistically significant difference.

Results

We found that 44% of the OCD patients had ADHD since childhood, while the remaining 56% did not have it at all. From that 44% (who had child ADHD), 68.2% of them still have adult ADHD (Figs. 1 and 2).

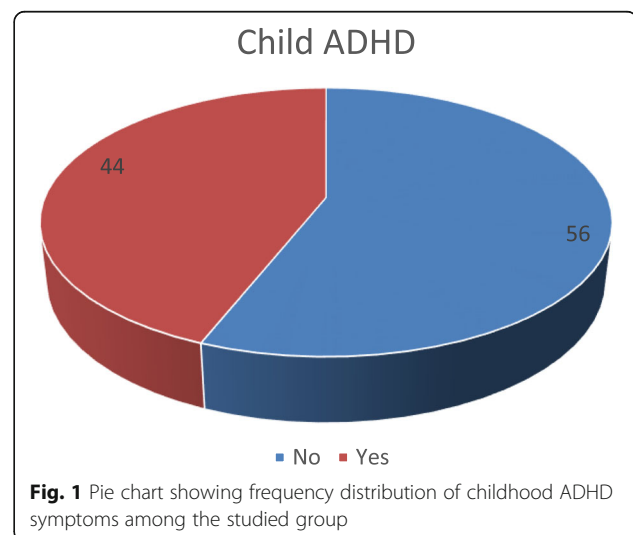
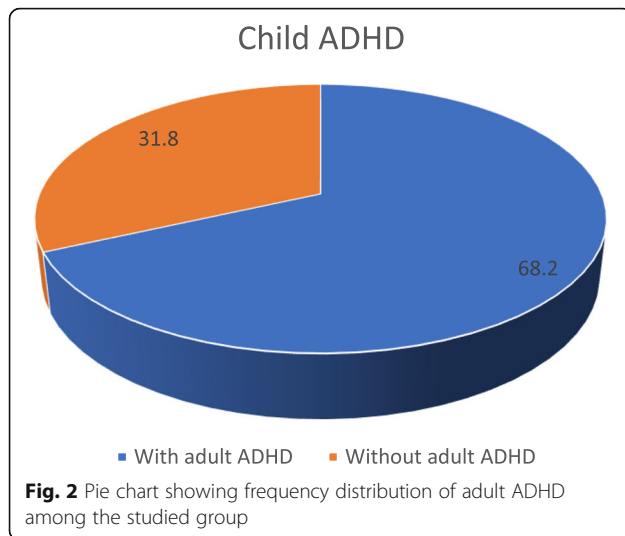


Fig. 1 Pie chart showing frequency distribution of childhood ADHD symptoms among the studied group



We found that there were significant differences between both groups regarding impulsivity, non-planning and motor subtypes which were found to be significantly higher among patients with adult ADHD when compared to those without adult ADHD (Table 1). There was a non-significant difference between the studied groups regarding HAMD, Y-BOCs, and HARS scores. However, it was noticed that all of them were found to be higher among those with ADHD when compared to those without ADHD (Table 2).

Upon comparing OCD patients without child ADHD symptoms versus those with child ADHD symptoms but not continued symptoms till adulthood, we found that there were significant differences between the studied groups regarding attention. However, the difference between them was non-significant regarding total impulsivity, motor activities, and non-planning that were higher among OCD adults with child ADHD symptoms

but not continued symptoms till adulthood (Table 3). We found also that there was a significant difference between the studied groups regarding HARS. However, the difference between them was non-significant regarding Y-BOCs and HAMD scores that were also higher among child ADHD symptoms but not continued symptoms till adulthood (Table 4).

Discussion

In this study, we explored the childhood symptoms of ADHD in an adult sample of OCD patients. We also compared the levels of impulsiveness, anxiety, and depression between obsessive-compulsive adults (who had a history of child ADHD) having and not having adult ADHD symptoms.

Our results revealed that 44% of the OCD patients had childhood ADHD symptoms, while the remaining 56% did not have it at all. From those having had child ADHD symptoms, 68.2% still had adult ADHD. In other words, about 30% of OCD patients have adult ADHD.

These results are coincident with previous studies where rates of childhood ADHD among OCD patients were 40% and 40.9%, respectively [23, 24]. Prevalence of ADHD among those having OCD has ranged between about 40 and 60% in adolescent and child psychiatry clinic [25], 59% within a sample of pediatric psychopharmacology clinic [26], 51% in a child OCD clinic [27], 43% among the sample of a genetic study in families [28], and 42% in a specialty clinic of OCD [29].

Our results are coincident with other studies where rates of adult ADHD among OCD patients were 19% and 23%, respectively [30, 31]. This finding confirms the idea that the co-occurring between these disorders continue until adulthood. Our results are higher than the results of previous studies where rates of adult ADHD among OCD patients were 13.7%, 13%, 8%, and 10%,

Table 1 Impulsivity among those with and without adult ADHD

Variable	OCD patients without adult ADHD (n = 14)	OCD patients with adult ADHD (n = 30)	MW	P
Impulsivity				
Mean ± SD	57.2 ± 23.1	88.4 ± 13.5	-3.972	< 0.001 (HS)
Median, range	51, 31-100	92, 62-107		
Attention				
Mean ± SD	21.6 ± 5.59	22.8 ± 4.08	-0.639	0.523 (NS)
Median, range	20, 8-28	22, 15-30		
Non-planning				
Mean ± SD	20.4 ± 11.2	35.2 ± 6.51	-3.678	< 0.001 (HS)
Median, range	17, 11-40	38, 15-42		
Motor				
Mean ± SD	17.5 ± 8.11	30.2 ± 7.10	-3.392	< 0.001 (HS)
Median, range	16, 11-35	32, 16-40		

P value, NS not significant, S significant, HS highly significant, SD standard deviation, MW Mann Whitney test

Table 2 Severity of OCD, depression, and anxiety among those with and without adult ADHD

Variable	OCD patients without adult ADHD (n = 14)	OCD patients with adult ADHD (n = 30)	MW	P
Severity of OCD (Y-BOCs)				0.658 (NS)
Mean ± SD	24.7 ± 8.81	26.3 ± 9.08	- 0.442	
Median	22.5	23		
Range	12–40	11–40		
Depression (HAMD)				0.369 (NS)
Mean ± SD	18.5 ± 10.8	21.3 ± 8.78	- 0.898	
Median	15	18		
Range	9–38	10–38		
Anxiety (HARS)				0.235 (NS)
Mean ± SD	24.6 ± 14.3	29.5 ± 13.1	- 1.187	
Median	26.5	28		
Range	9–50	12–50		

respectively [32–35]. They used different sample characteristics with different age ranges (18–80).

Regarding impulsivity scores

There is a highly significant difference between (childhood ADHD symptoms + OCD) patients with adult ADHD and without regarding total impulsivity, non-planning, and motor subtypes which were found to be significantly higher among patients with adult ADHD when compared to those without adult ADHD. However, there is a non-significant difference between the studied groups regarding attentional subtype.

Our results are consistent with another study that found patients with ADHD and OCD had significantly higher total, attentional, and motor subscale scores of BIS-11 compared with pure OCD patients. Particularly, total scores of BIS-11 were strongly associated with comorbid diagnosis of OCD and ADHD [36]. Another

study found that there were significant correlations between the attentional subscores of BIS-11 and total obsession and compulsion subscale scores of Y-BOCS among OCD patients [37]. Therefore, our findings might suggest that attentional impulsivity scores are higher regardless of childhood ADHD symptoms continued into adulthood or not. Therefore, impulsivity might be one of the significant indicators of comorbidity between OCD and ADHD.

Upon comparing OCD patients without child ADHD symptoms and those with child ADHD symptoms but not continued symptoms till adulthood, we found that there were significant differences between the studied groups regarding attentional and motor impulsivity. However, the difference between them was non-significant regarding total impulsivity and non-planning which was found to be higher among patients with child ADHD symptoms when compared

Table 3 Relationship between impulsivity in those without child ADHD and those with child and adult ADHD

Variable	OCD without child ADHD (n = 56)	OCD with child without adult ADHD (n = 14)	MW	P
Impulsivity				
Median	43.5	51	- 1.059	0.290 (NS)
Range	32–112	31–100		
Attention				
Median	14.5	20	- 2.699	0.007 (S)
Range	8–30	8–28		
Non-planning				
Median	14.5	17	- 0.458	0.647 (NS)
Range	11–42	11–40		
Motor				
Median	13	16	- 0.266	0.790 (NS)
Range	10–40	11–35		

Table 4 Relationship between severity of OCD, depression, anxiety, and child ADHD among the studied groups

Variable	OCD without child ADHD (n = 56)	OCD with child without adult ADHD (n = 14)	MW	P
Severity of OCD (Y-BOCs)				
Median	24	33	- 1.594	0.111 (NS)
Range	9–40	16–38		
Depression (HAMD)				
Median	17	32	- 0.562	0.547 (NS)
Range	8–37	9–35		
Anxiety (HARS)				
Median	26.5	48	- 3.100	0.002 (S)
Range	9–50	12–50		

to those without adult ADHD. All of this indicates that a history of ADHD symptoms, even not continued till adulthood, causes higher impulsivity scores. Up to our knowledge, no previous studies discussed this finding.

Regarding depression and anxiety scores

It was noticed that depression and anxiety scores were found to be higher but not significant among (childhood ADHD symptoms+ OCD) patients with adult ADHD when compared to those without. We agree with a previous study that found OCD patients with comorbid ADHD presented more severe anxiety symptoms. The comorbidity between OCD and anxiety symptoms has been demonstrated over the years, with some papers reporting that anxiety disorders are the most frequent comorbid conditions in OCD [38], with frequencies that range from 62 [39] to 75.8% [30].

We disagree with the findings of previous studies that found that subjects with OCD had other mental disorders, mainly anxiety disorders (generalized anxiety disorder, social phobia, simple phobias, panic disorder, and separation anxiety disorder), confirming that those disorders are much more co-occurring in childhood and adolescence [40, 41]. However, this high co-occurrence was not affected by ADHD comorbidity. Our results are additionally conflicting with other research that found that no patient with OCD plus ADHD had depressive or anxiety disorders [42].

We found that there was a noteworthy contrast with regards to HARS which was observed to be higher among patients with child ADHD symptoms not continued till adulthood versus those without child ADHD manifestations. The difference was non-significant as regards the HAMD scores which were observed to be higher among patients with child ADHD symptoms not continued till adulthood. All of this indicates that the history of ADHD symptoms, even not continued until adulthood, causes more anxiety and depression

comorbidity. As indicated by our insight, no past papers examined these discoveries.

Regarding the severity of OCD

There is a non-significant difference between (childhood ADHD symptoms +OCD) patients with adult ADHD and without regarding Y-BOCs scores.

According to a previous study, no significant differences were noticed between the OCD with ADHD and OCD without ADHD groups regarding mean Y-BOCS compulsion, obsession, and total scores [23]. Another investigation compared the OCD patients with and without adulthood ADHD in terms of several clinical and demographic variables. They found that both groups did not differ greatly in the current OCs severity [42]. Our outcomes are conflicting with a past report that discovered higher total and obsession severity according to the Y-BOCS among OCD adults comorbid with ADHD [35].

We found that Y-BOCs scores were higher but not significant among patients with child ADHD symptoms but not continued symptoms till adulthood versus those without child ADHD symptoms. According to our knowledge, no previous papers discussed this finding.

Limitations

This study is a cross-sectional study, which eliminates the causal efficacy of all data; therefore, we can only infer the direction of the association between trait ADHD and OCD. The current study is sensitive to recall bias. The good psychometric properties of the WURS may somewhat balance this limitation. The sample size of the study was small, especially when dividing into groups. There was no healthy control group in this study, and such reports among the general population may get similar results found in the patients with OCD.

Conclusion

Childhood ADHD symptoms are experienced by a significant number of patients in this sample. ADHD in adults with OCD is associated with some features impairing the general clinical picture including higher levels of anxiety and impulsiveness reflecting a more chronic illness. A childhood history of ADHD symptoms, even not continued till adulthood, causes more impulsiveness, more severe OCD symptoms, and more anxiety and depression comorbidities. Our study suggests that childhood ADHD symptoms need more attention in psychiatric clinical practice and scientific research.

Abbreviations

ADHD: Attention deficit hyperactivity disorder; BIS-11: Barratt Impulsiveness Scale, Version 11; HAMD/HDRS: The Hamilton Depression Rating Scale; HARS: Hamilton Anxiety Rating Scale; IRB: Institutional Review Board; OCD: Obsessive-compulsive disorder; SPSS: Statistical Package for the Social Sciences; WURS: The Wender Utah Rating Scale; Y-BOCS: Yale-Brown Obsessive-Compulsive Scale

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Authors' contributions

WA designed the study. AF analyzed and interpreted the patient data. NR contributed to writing the manuscript. LI collected the patients' data and applied the scales. All authors read and approved the final manuscript.

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Availability of data and materials

Available upon request

Ethics approval and consent to participate

Approval was obtained from the Institutional Review Board (IRB), Ethics Committee of the Psychiatry Department, Zagazig University (reference number is 3848). Written informed consent was obtained from participants after discussing with them the aim of the study.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

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References

- American Psychiatric Association (2013) Diagnostic and statistical manual of mental disorders. American Psychiatric Association, Arlington
- Thomas R, Sanders S, Doust J, et al. (2015) Prevalence of attention-deficit/hyperactivity disorder: a systematic review and meta-analysis. *Pediatrics*;135: e994–1001. DOI: <https://doi.org/10.1542/peds.2014-3482>
- Biederman J, Mick E, Faraone SV et al (2000) Age-dependent decline of symptoms of attention deficit hyperactivity disorder: impact of remission definition and symptom type. *Am J Psychiatry* 157:816–818. <https://doi.org/10.1176/appi.ajp.157.5.816>
- American Psychiatric Association (1994) Diagnostic and statistical manual of mental disorders, 4th edn. American Psychiatric Association, Washington, DC
- Abramovitch, A., Dar, R, Mittelman A., and Wilhelm, S. (2015). Comorbidity between attention-deficit hyperactivity disorder and obsessive-compulsive disorder across the lifespan: a systematic and critical review. *Harv Rev Psychiatry*. 2015 Jul-Aug;23(4):245-262. DOI: <https://doi.org/10.1097/HRP.000000000000050>.
- Abramovitch A, Dar R, Mittelman A, Schweiger A. (2013) Don't judge a book by its cover: ADHD-like symptoms in obsessive-compulsive disorder. *J Obsessive Compuls Relat Disord*;253–61. .doi.org/<https://doi.org/10.1016/j.jocrd.2012.09.001>
- March JS, Leonard HL (1996) Obsessive-compulsive disorder in children and adolescents: a review of the past 10 years. *J Am Acad Child Adolesc Psychiatry* 35:1265–1273. <https://doi.org/10.1097/00004583-199610000-00012>
- Lee SS, Falk AE, Aguirre VP (2012) Association of comorbid anxiety with social functioning in school-age children with and without attention-deficit/hyperactivity disorder (ADHD). *Psychiatry Res* 197:90–96. <https://doi.org/10.1016/j.psychres.2012.01.018> Epub 2012 Mar 26
- De Mathis MA, Diniz JB, Hounie AG, Shavitt RG, Fossaluza V, Ferrã Y et al (2013) Trajectory in obsessive-compulsive disorder comorbidities. *Eur Neuropsychopharmacol* 23:594–601. <https://doi.org/10.1016/j.euroneuro.2012.08.006> Epub 2012 Aug 22
- Wiliens TE, Biederman J, Faraone SV, Martelon M, Westerberg D, Spencer TJ (2009) Presenting ADHD symptoms, subtypes, and comorbid disorders in clinically referred adults with ADHD. *J Clin Psychiatry* 70:1557–1562. <https://doi.org/10.4088/JCP.08m04785pur>
- First, M. B. (2014). Structured clinical interview for the DSM (SCID). The encyclopedia of clinical psychology, 1-6.
- Hamilton M. (1960) A rating scale for depression. *J Neurol Neuro-surgery Psychiatry*; 23:56 – 62. DOI: <https://doi.org/10.1136/jnnp.23.1.56>
- Fateem, L. (1998). Hamilton depression rating scale (Arabic translation). Cairo, Egypt: The Anglo Egyptian Bookshop.
- Hamilton M (1959) The assessment of anxiety states by rating. *Br J Med Psychol* 32:50–55
- Fateem, L. (1998). Hamilton anxiety rating scale (Arabic translation). Cairo, Egypt: The Anglo Egyptian Bookshop.
- Goodman WK, Price LH, Rasmussen SA, Mazure C, Fleischmann RL, Hill CL et. al. (1989) The Yale-Brown Obsessive-Compulsive Scale: measures of internal consistency. *Psychiatry Res*; Volume 51, Issue 2, February 1994, Pages 203-211
- Okasha A, Saad A, Khalil AH, El Dawla AS, Yehia N (1994) Phenomenology of obsessive-compulsive disorder: a transcultural study. *Compr Psychiatry* 35: 191–197
- Patton JH, Stanford MS, Barratt ES. Factor structure of the Barratt impulsiveness scale (1995). *Clin Psychol*; Nov;51(6):768-774.
- Rafei H, Ghanem M, Gamaluddin H, et al. (2009): Psychiatric assessment of cases with self-inflicted poisoning in a sample of Egyptian children and adolescents. MD Thesis in psychiatry Ain shams University.
- Wender PH (1995) Attention-deficit hyperactivity disorder in adults. New York, NY: Oxford University Press.
- Abdelkarim A, Salama H, Ibrahim S, Abou El Magd O (2015) The prevalence and characteristics of attention-deficit hyperactivity disorder among a sample of Egyptian substance-dependent inpatients. *Egypt J Psychiatry* 2015(36):9–13
- Daigre BC, Ramos-Quiroga JA, Valero S, Bosch R, Roncero C et al (2009) Adult ADHD Self Report Scale-V1.1 (ASRS-V1.1) symptom checklist in patients with substance use disorders. *Actas Eso Psiquiatr* 37:299–305
- Çelebi F., Koyuncu A., Ertekin E., Alyanak B., and Tükel R. (2016). The features of comorbidity of childhood ADHD in patients with obsessive-compulsive disorder. *Journal of Attention Disorders*; 1 –8. DOI:<https://doi.org/10.1177/1087054716669228>
- Tan O, Metin B, Metin S (2016) Obsessive-compulsive adults with and without childhood ADHD symptoms. *ADHD Atten Def Hyp Disord*; ep 8(3): 131–138. <https://doi.org/10.1007/s12402-016-0196-3> Epub 2016 Apr 7
- Coskun M, Zoroglu S, Ozturk M (2012) Phenomenology, psychiatric comorbidity and family history in referred preschool children with obsessive-compulsive disorder. *Child Adolesc Psychiatry Ment Health* 6(1): 36. <https://doi.org/10.1186/1753-2000-6-36>
- Geller D, Biederman J, Faraone SV, Frazier J, Coffey BJ, Kim G et al (2000) Clinical correlates of obsessive-compulsive disorder in children and adolescents referred to specialized and non-specialized clinical settings. *Depress Anxiety* 11:163–168. <https://doi.org/10.1002/1520-6394>
- Geller DA, Biederman J, Faraone S, Agranat A, Craddock K, Hagermoser L et al (2001) Developmental aspects of obsessive-compulsive disorder: findings in children, adolescents, and adults. *J Nerv Ment Dis* 189:471–477

28. Joshi G, Wozniak J, Petty C, Vivas F, Yorks D, Biederman J et al. (2010) Clinical characteristics of comorbid obsessive-compulsive disorder and bipolar disorder in children and adolescents. *Bipolar Disord*; 12:185–195 DOI: <https://doi.org/10.1111/j.1399-5618.2010.00795.x>.
29. Geller DA, Wieland N, Carey K, Vivas F, Petty CR, Johnson J et al (2008) Perinatal factors affecting the expression of obsessive-compulsive disorder in children and adolescents. *J Child Adolesc Psychopharmacol* 18:373–379. <https://doi.org/10.1089/cap.2007.0112>
30. Ruscio A, Stein D, Chiu W, Kessler R (2010) The epidemiology of obsessive-compulsive disorder in the National Comorbidity Survey Replication. *Mol Psychiatry* 15:53–63. <https://doi.org/10.1038/mp.2008.94> Epub 2008 Aug 26
31. Anholt GE, Cath DC, van Oppen P et al (2010) Autism and ADHD symptoms in patients with OCD: are they associated with specific OC symptom dimensions or OC symptom severity? *J Autism Dev Disord* 40:580–589. <https://doi.org/10.1007/s10803-009-0922-1>
32. Mancebo MC, Garcia AM, Pinto A et al (2008) Juvenile-onset OCD: clinical features in children, adolescents, and adults. *Acta Psychiatr Scand* 118:149–159. <https://doi.org/10.1111/j.1600-0447.2008.01224.x>
33. Frost RO, Steketee G, Tolin DF (2011) Comorbidity in hoarding disorder. *Depress Anxiety* 28:876–884. <https://doi.org/10.1002/da.20861> Epub 2011 Jul 18
34. De Mathis MA, Diniz J, Hounie A et al (2013) Trajectory in obsessive-compulsive disorder comorbidities. *Eur Neuropsychopharmacol* 23:594–601. <https://doi.org/10.1016/j.euroneuro.2012.08.006> Epub 2012 Aug 22
35. Blanco-Vieira T, Santos M, Ferrão Y. A., Torres A. R, Miguel E. C., Bloch M. H. et al, (2019) The impact of attention deficit hyperactivity disorder in obsessive-compulsive disorder subjects. *Depress Anxiety*; 36(6):533-542. DOI: <https://doi.org/10.1002/da.22898>. Epub 2019 Apr 16.
36. Mersin Kilic S, Dondu A, Memis C. O., Ozdemiroglu F, and Sevincok L. (2016) The clinical characteristics of ADHD and obsessive-compulsive disorder comorbidity. *Journal of Attention Disorders* 1 –7 DOI.org/<https://doi.org/10.1177/1087054716669226>
37. Ettelt S, Ruhrmann S, Barnow S, Buthz F, Hochrein A, Meyer K et al (2007) Impulsiveness in obsessive-compulsive disorder: results from a family study. *Acta Psychiatrica Scandinavica* 115:41–47. <https://doi.org/10.1111/j.1600-0447.2006.00835.x>
38. Diniz JB, Miguel EC, Oliveira ARD, Reimer AE, Brandão ML, Mathis MAD et al (2012) Outlining new frontiers for the comprehension of obsessive-compulsive disorder: a review of its relationship with fear and anxiety. *Revista Brasileira de Psiquiatria* 34:81–91
39. Torres AR, Prince MJ, Bebbington PE, Bhugra D, Brugha TS, Farrell M et al (2006) Obsessive-compulsive disorder: Prevalence, comorbidity, impact, and help-seeking in the British National Psychiatric Morbidity Survey of 2000. *Am J Psychiatry* 163(11):1978–1985
40. Masi G, Millepiedi S, Mucci M, Bertini N, Pfanner C, Arcangeli F (2006) Comorbidity of obsessive-compulsive disorder and attention-deficit/hyperactivity disorder in referred children and adolescents. *Comprehensive Psychiatry* 47(1):42–47. <https://doi.org/10.1016/j.comppsy.2005.04.008>
41. Masi G, Perugi G, Toni C, Millepiedi S, Mucci M, Akiskal HS (2004) Obsessive-compulsive-bipolar comorbidity: focus on children and adolescents. *J Affect Disord* 78:175–183. [https://doi.org/10.1016/S0165-0327\(03\)00107-1](https://doi.org/10.1016/S0165-0327(03)00107-1)
42. Walitza S, Zellmann H, Irblich B, Lange KW, Tucha O, Hemminger U et al (2008) Children and adolescents with obsessive-compulsive disorder and comorbid attention-deficit hyperactivity disorder: preliminary results of a prospective follow-up study. *J Neural Transm* 115:187–190. <https://doi.org/10.1007/s00702-007-0841-2> Epub 2008 Jan 16

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