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ANXIETY DISORDERS (A PELISSOLO, SECTION EDITOR)

Epidemiological and Clinical Gender Differences in OCD

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Abstract

Purpose of Review This review highlights recent research regarding gender differences in OCD, with a focus on prevalence, course of illness, symptom presentation, comorbidity, and treatment response.

Recent Findings Overall, findings remain mixed. OCD may be more common among males in childhood, but is more common among females in adolescence and adulthood. Males tend to report an earlier age of onset and present with symptoms related to blasphemous thoughts. Females often describe symptom onset as occurring during or after puberty or pregnancy and present with symptoms related to contamination and/or aggressive obsessions. Females also tend to report significantly higher depression and anxiety. There are no reported gender differences in treatment outcome.

Summary Gender may play a role in the onset, presentation, and impact of OCD symptoms. However, more work is needed to account for differences across studies, with one promising future direction being the study of reproductive hormones.

Keywords Obsessive-compulsive disorder · Gender differences · Epidemiology · Exposure and response prevention

Introduction

Obsessive-compulsive disorder (OCD) is characterized by anxiety-provoking intrusive thoughts, images, or urges (i.e., obsessions), coupled with behavioral efforts aimed at reducing the anxiety (i.e., compulsions). OCD is notably heterogenous, and previous research has identified four common symptom dimensions: (1) concerns about germs and contamination; (2) responsibility for harm; (3) blasphemous thoughts; and (4) symmetry, completeness, and the need for things to be "just right" [1]. Contamination symptoms are often characterized by obsessions about dirt or illness, coupled with washing or cleaning compulsions. The responsibility for harm dimension represents obsessions related to unintentional harm, such as car accidents or injury, typically coupled with checking behaviors, reassurance seeking, and mental review of past events. Blasphemous thoughts are intrusive obsessions about immoral themes, such as sex or violence, which are often accompanied by mental actions to eliminate the thought or avoidance of triggers related to the obsessions. Finally, the symmetry, completeness, and need for things to be "just right" dimension is characterized by sensory-perceptual disturbances regarding the appearance or feeling of internal or external stimuli, often coupled with repeating, arranging, or counting compulsions to resolve the discomfort.

Obsessive-compulsive symptoms (OCS) occur along a severity continuum that includes non-clinical, sub-clinical, and clinical symptoms [1]. It is thought that sub-clinical OCS may be a precursor to the development of the disorder, and can cause even some distress and impairment [2]. For example, individuals with subclinical contamination symptoms may feel a need to wash their hands for 5 min every time they use the restroom, thereby resulting in increased impairment at work and home. Therefore, both OCS and OCD can significantly impact quality of life by disrupting one's ability to work or go to school, interact with friends and family, and/or easily engage in activities of daily living [3]. Further, the societal cost of OCD is estimated at over $8 billion per year, making it a severely disabling and burdensome disorder [4].

Taken together, OCD is a distressing disorder that causes significant functional impairment across varied degrees of symptom severity. Importantly, though OCD was previously thought to be rare, research over the past three decades has elucidated the impact of the disorder, thereby pointing to a

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need for continued work in order to treat and prevent symptoms. The purpose of this review is to summarize recent epidemiological and clinical studies on OCD and OCS with a focus on gender differences (see Table 1). Importantly, existing work regarding the prevalence of OCD among males and females has been largely mixed, with some work indicating an equal distribution [5–7], and other work indicating a greater proportion of males [8] or females [9••]. As such, this review aims to summarize recent empirical work and provide areas for future direction that may help to reconcile disparate findings. We have organized the following review by describing recent work regarding prevalence estimates, course of illness, symptom presentation, comorbidity patterns, and treatment outcome across the general population and among males and females. We conclude by providing conclusions and recommendations for future research.

Prevalence Estimates

OCD is estimated to affect approximately 1–3% of the population [10, 11]. Indeed, in one of the largest studies to systematically assess the impact of mental illness in the USA, lifetime and past year OCD prevalence estimates among adults ($n = 2073$) were 2.3% and 1.2%, respectively [11]. Further, more recent studies have produced complimentary results across adult and adolescent samples (see Table 1). In a 30-year longitudinal cohort study conducted among a community sample of adults in Switzerland ($n = 591$), Fineberg and colleagues [9••] found a weighted cumulative prevalence rate of 3.5%. Similarly, in samples of adolescents from Greece and Brazil, there were past-month prevalence estimates of 1.39% [12•] and 3.3% [13•], respectively.

When considering the role of gender, past studies utilizing samples of children have largely identified a greater proportion of males presenting with OCD [8, 14, 15], whereas samples of adults either find equal distributions [6] or a greater proportion of females [16]. More recent work provides further evidence of such differences in adults and adolescents (see Table 1). In the aforementioned longitudinal cohort study, the weighted cumulative OCD prevalence rates were 5.3% for females and 1.7% for males [9••]. Similarly, past-month OCD prevalence estimates were higher in girls (4.9%) than in boys (1.4%) in a sample of adolescents [13•].

Importantly, though prevalence estimates of OCD have remained largely consistent across cultures and sample types, estimates of sub-clinical OCS have ranged significantly from two to 19% of the population [10, 17, 18]. Such variation has continued to be seen in recent work and may reflect differences in age of the sample and country of origin (see Table 1). Among a community sample of adults in Switzerland, the weighted cumulative prevalence rate of subclinical OCS was 9.7% [9••]. In Greece, subclinical OCS were estimated to impact approximately 2.7% of a sample of adolescents in the past month [12•]. Finally, in Brazil, past-month prevalence was 18.3% in adolescents [13•] and 19.4% in children ages six to 12 [19••]. Moreover, prevalence estimates of gender differences of subclinical OCS also significantly vary. Fineberg and colleagues [9] found that rates of OCS were comparable among females (9.3%) and males (10.1%). In contrast, two studies utilizing samples of adolescents found significantly higher rates of OCS among females than males [12•, 13•], and one study of children found that males were more likely to endorse at least one symptom of OCD than were females [19••]. Therefore, though prevalence rates and gender differences in OCD are mostly consistent, rates and differences of subclinical OCS are less clear.

Course of Illness

In general, non-clinical or sub-clinical OCS are often present in childhood, though OCD may not onset until adolescence or early adulthood, with the majority of cases exhibiting a chronic and fluctuating course [10, 20]. Indeed, the recent adult cohort study in Switzerland indicated that age of onset for subclinical OCS and OCD were 16 and 19, respectively, though mean age of any symptom onset was 9.76 years [9••]. Further, of the sample, 36.7% of OCD cases and 28.6% of OCS cases had emerged by ages 19–20 years, and relatively few new cases emerged after age 30, further supporting that onset typically occurs by early adulthood.

In regard to gender differences, prior work has suggested that males have a younger age of onset, which in turn, is associated with greater severity and chronicity of symptoms [21]. However, recent findings have been somewhat mixed (see Table 1). One study found that males, as compared to females, reported a younger age at which symptoms were the most severe and age at which one sought treatment, though no gender differences in age of onset [22••]. Similarly, there was a significant, albeit small, difference in age of onset of any symptoms among an adult cohort in Switzerland, with males reporting an average age of onset at 19 years as compared to 21 years for females [9••]. In contrast, two studies utilizing samples of children with OCD found no gender differences in age of onset [13•, 23], nor differences in symptom severity [23]. Therefore, while no studies to our knowledge have reported that females have a younger age of onset, it is unclear whether there are consistent gender differences.

OCD Symptom Dimension

Overall, there appear to be differences in prevalence and severity of OCD symptom dimensions across gender, though this may not be present in younger populations (see

Table 1 Characteristics of recent studies examining gender differences in OCD

Author/year	Sample type	Age range	Sample size	Country	Study design	Diagnostic measure of OCD	Self-report measure of OCD	Main findings
Alvarenga et al. 2015	Community/ children	6–12 years	9937 (47.59% female)	Brazil	Cross-sectional	FHS	Dimensional-Y-BOCS	-OCS more common in males
Fineberg et al. 2013	Community/adult cohort	20/21 to 49/50 years	591 (50.59% female)	Switzerland	Longitudinal	SPIKE	SCL90R-OC subscale	-OCD more prevalent in females -Subclinical OCS more prevalent in males -Males reported younger age of onset
Politis et al. 2017	Community/adolescents	16–18 years	2431 (59% female)	Greece	Cross-sectional	CIS-R	N/A	-Greater proportion of subclinical OCS in females -No gender differences in symptom dimensions
Torresan et al. 2013	Clinical/adults with OCD	18–77 years	858 (58.7% female)	Brazil	Cross-sectional	SCID-IV	Y-BOCS and Dimensional-Y-BOCS	-No gender differences in age of onset -Males reported younger age of symptom worsening -Gender differences in symptom dimensions and comorbid conditions
Vivan et al. 2014	Community/adolescents	14–17 years	2323 (53.2% female)	Brazil	Cross-sectional	K-SADS	Y-BOCS and Dimensional-Y-BOCS	-Greater proportion of females with OCD and OCS -No gender differences in symptom dimensions

CIS-R revised clinical interview schedule, *FHS* Family History Scale, *K-SADS* schedule for affective disorders and schizophrenia for school aged children, *SCID-IV* structured clinical interview for DSM-IV, *SCL90R* Symptom Checklist 90-R, *SPIKE* Structured Psychopathological Interview and Rating of the Social Consequences for Epidemiology, *Y-BOCS* Yale-Brown Obsessive-Compulsive Scale

Table 1). Indeed, recent studies have found no gender differences in OCD symptom dimensions among school-aged children and adolescents in Brazil [13•, 19••]. However, among adults in Brazil, females were more likely to endorse symptoms related to contamination concerns and/or aggressive thoughts, whereas males were more likely to report blasphemous thoughts [22••], which is consistent with prior work [24, 25]. Interestingly and consistent with this difference, postpartum OCD symptoms are often characterized by obsessions regarding contamination and aggression toward the child, such as unintentionally harming or causing the child to become sick [26]. Given that OCD may be more common among adult females, it is theoretically plausible that the prevalence of specific symptom dimensions is driven by gender differences, though no study to our knowledge has systematically explored this hypothesis.

It should be noted that in contrast to prior work, a recent study found no gender differences in OCD symptom dimensions in an adult community sample [27]. However, there were differences in the relation between OCD symptom dimensions, such that the relation between OCD symptom dimensions was significantly stronger in males than in females. The authors suggest that males may tend to report symptoms across a wide range of symptom types, whereas females may present with only one or two symptoms. However, these findings should be replicated, particularly in a clinical sample, before further conclusions can be drawn.

Comorbidity

Individuals with OCD often present with at least one comorbid condition. Indeed, in one study utilizing a sample of 382 participants with OCD, approximately 55% of individuals met diagnostic criteria for a current comorbid condition, and approximately 78% met diagnostic criteria for a lifetime condition [28]. The most common comorbid conditions were anxiety, mood, and other OC-spectrum disorders [28], a finding that was replicated in a separate sample of patients with OCD [29]. Interestingly, Hofmeier-Sevink and colleagues [28] also found that individuals with two or more comorbid conditions reported OCD symptoms that were more severe and chronic than those with only one comorbid condition, and that having any comorbid condition was associated with a longer course of illness. Importantly, such findings are also present in child populations, such that recent work has indicated that most children with OCD also meet diagnostic criteria for at least one other comorbid condition (56%), with the most common comorbidities being depression and anxiety disorders [13•].

Importantly, gender may play a role in the specific comorbid disorders present. In a sample of adults with primary OCD, Torresan and colleagues [22••] found no gender differences in the presence of any comorbid conditions. However, males were more likely to endorse symptoms of social phobia, tic disorders, alcohol use disorders, compulsive internet use, and sexual disorders, whereas females were more likely to endorse specific phobias, anorexia nervosa, bulimia nervosa, trichotillomania, skin picking, and compulsive buying [22••]. Further, when considering self-report measures, females had significantly higher scores on measures of depression, anxiety, and OCD than did males. Somewhat in contrast to the aforementioned findings, Fineberg and colleagues [30] found that among an adult community sample, being female was statistically associated with greater alcohol use, depression, generalized anxiety, social phobia, agoraphobia, and simple phobia. Notably, these disparate findings may reflect the populations used (i.e., clinical versus community) and associated degree of symptom severity reflected in each sample. Therefore, it may be that males and females exhibit different patterns of comorbid symptoms at varying degrees of OCD symptom severity.

Interestingly, recent research regarding comorbidity patterns in adolescents and children somewhat parallels that in adults. Vivan and colleagues [13•] found that in a sample of high school students with OCD, females scored significantly higher on a self-report measure of depression than did males, whereas males were more likely to have a tic disorder. Additionally, in a large sample of children and adolescents with primary OCD, males were twice as likely as females to have an externalizing disorder [31]. Overall, consistent with known gender differences in the prevalence of internalizing and externalizing disorders [32], females with OCD may be likely to experience comorbid internalizing symptoms, whereas males may be more prone to externalizing.

Treatment Response The gold-standard treatment for OCD is cognitive behavioral therapy (CBT) with an emphasis on exposure and response prevention (ERP) and often, but not always, coupled with pharmacological treatment [33]. CBT with ERP consists of individuals exposing themselves to feared thoughts and subsequently resisting urges to engage in typical compulsive behaviors [34]. Serotonin reuptake inhibitors (SRIs) and serotonin-norepinephrine reuptake inhibitors (SNRIs) are typically used as pharmacological treatment, often to augment the effects of behavioral treatment, though studies investigating the efficacy of both CBT and medication have shown mixed effects [35, 36].

Importantly, gender has not been shown to be associated with any differences in treatment response for behavioral treatment or pharmacology. Indeed, recent work has indicated no associations between gender and treatment response in both outpatient and intensive residential treatment settings [37, 38]. Further, gender is not associated with response to pharmacological treatment [39]. Interestingly, a recent long-term follow-up treatment study indicated that being male was associated with greater symptom remission over the course of two, but not five, years [40, 41]. The authors noted that a

closer examination of their data indicated that females reported a faster decrease and subsequent remission of symptoms, thereby explaining the differences across time. Nonetheless, the extant literature suggests males and females respond similarly to treatment for OCD.

Conclusions and Future Directions Taken together, OCD is a heterogeneous and disabling disorder that may affect up to 3% of the population, with higher estimates when considering subclinical OCS. It has been hypothesized that gender may be one reason why symptoms differ, as gender is associated with differential symptom presentation, course of illness, and comorbidity patterns.

Our review of recent literature indicates some consistencies and discrepancies when examining gender differences in OCD. In general, it appears that when gender differences are present, findings indicate a higher proportion of females with OCD in adolescent and adult samples [9••, 13•], and a younger age of onset or symptom worsening for males [9••, 22••]. Further, among adults, females are more likely to endorse symptoms related to contamination and/or responsibility for harm, and men are more likely to endorse blasphemous thoughts [22••]. Additionally, there are no reported gender differences in treatment outcome [37, 38] nor prevalence of comorbid conditions [22••], though gender may impact the presence of specific comorbid conditions [13•, 22••, 30]. Importantly, however, in contrast to the aforementioned findings, some studies have found no gender differences in prevalence rate, age of onset, and/or symptom dimension [9••, 13•, 19••, 22••, 23, 27]. Therefore, there is a need for more work to reconcile the aforementioned discrepancies.

There may be many reasons for the disparate findings across studies. To start, they may be, in part, due to cultural and/or developmental differences. Much of the reviewed literature occurred in different countries utilizing samples of adults, adolescents, and children. There is indeed a growing body of literature suggesting that culture may be an understudied area of research within OCD [42, 43]. Further, as noted above, though OCD is considered a chronic disorder with an early onset, there are significant differences in presentation across children and adults. Therefore, more work is needed to elucidate the impact of culture and/or lifespan development on the onset and exacerbation of symptoms.

One hypothesis for the presence of differences over the lifespan is that ovarian hormones may play a significant role in the pathogenesis of the disorder, thereby placing females at greater risk for developing OCD during and after menarche and/or pregnancy [44, 45]. Indeed, approximately one-quarter of females with OCD report symptom onset at menarche [45]. Additionally, in a meta-analysis regarding the prevalence of postpartum OCD among women, Russell, Fawcett, and Mazmanian [46] found a prevalence estimate of 1.08% among women in the general population, as compared to 2.07% of women during pregnancy and 2.43% of women during the postpartum period. Further, a risk analysis revealed that women who are pregnant or in the postpartum period are 1.5 to 2 times more likely to develop OCD as compared to the general population. Finally, a recent animal study found that female rates who were in phases of their estrous cycle in which ovarian hormones were low exhibited blunted responses to fear extinction [47••]. Taken together, these findings suggest that ovarian hormones may indeed interact with known neurobiological mechanisms to confer risk for OCD, thereby helping to explain gender differences over time.

Moreover, given the aforementioned work regarding the role of female hormones in the development of OCD, future work should examine associations between biological sex, gender identity, and OCD symptom expression. It should be noted that all work included in the current review measured gender using self-identified demographic questionnaires. However, there is growing awareness that gender expression is distinct from biological sex. Therefore, more research regarding biological mechanisms may prove promising in understanding observed sex and gender differences.

Another reason for differing findings may be due to a lack of standardized definition of subclinical OCS. For example, Politis and colleagues [12•] identified individuals with subclinical OCS as those who endorsed obsessions and/or compulsions without any significant distress or impairment. In contrast, Fineberg and colleagues [9••] defined OCS as having obsessions and/or compulsions, with either distress or impairment. This lack of consistency may help to explain why prevalence estimates of subclinical OCS vary significantly more than do estimates of OCD. Given that OCS may confer risk for the development of OCD, future work should focus on standardizing the definition of subclinical OCS in order to clarify prevalence rates, gender differences, and risk for OCD.

Finally, the disparate findings may also be due to differences in methods of measurement. Though recent work suggests that OCD symptoms are best measured using dimensional scales of each symptom dimension [1], existing research continues to use a variety of measures that assess the presence of discrete symptoms using a categorical approach. Further, much of the extant literature regarding gender differences in OCD may not be accounting for more contemporary conceptualizations of the disorder. For example, much of the literature in this review used measures of OCD that include symptoms of hoarding [13•, 19••, 22••], despite hoarding disorder now being considered a distinct diagnosis [32]. As such, prevalence estimates and gender differences may be confounded by the presence of hoarding symptoms.

In sum, gender may play a role in the onset, presentation, and impact of OCD symptoms. Though the extant literature remains largely mixed, there is some evidence that there may be a higher proportion of adult females with OCD, males may have a younger age of onset, and males and females may

experience different types of OCD symptoms. Further, there appear to be no gender differences in likelihood of comorbidity and treatment outcome. Importantly, in light of the aforementioned inconsistencies, further work is needed to reconcile and account for the differences, with one promising area being the study of biological differences that may clarify the neurobiological risk for OCD among both males and females.

Compliance with Ethical Standards

Conflict of Interest Brittany M. Mathes, Danielle M. Morabito, and Norman B. Schmidt each declare no potential conflicts of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

References

Papers of particular interest, published recently, have been highlighted as:
- • Of importance
- •• Of major importance

1. Abramowitz JS, Deacon BJ, Olatunji BO, Wheaton MG, Berman NC, Losardo D, et al. Assessment of obsessive-compulsive symptom dimensions: development and evaluation of the dimensional obsessive-compulsive scale. Psychol Assess. 2010;22(1):180–98.
2. Wittchen HU, Jacobi F, Rehm J, Gustavsson A, Svensson M, Jönsson B, et al. The size and burden of mental disorders and other disorders of the brain in Europe 2010. Eur Neuropsychopharmacol. 2011;21(9):655–79.
3. Hollander E, Stein DJ, Kwon JH, Rowland C, Wong CM, Broatch J, et al. Psychosocial function and economic costs of obsessive-compulsive disorder. CNS Spectr. 1997;2(10):16–25.
4. DuPont RL, Rice DP, Shiraki S, Rowland CR. Economic costs of obsessive-compulsive disorder. Med Int. 1995;8(4):102–9.
5. Canals J, Hernández-Martínez C, Cosi S, Voltas N. The epidemiology of obsessive–compulsive disorder in Spanish school children. J Anxiety Disord. 2012;26(7):746–52.
6. Fullana MA, Mataix-Cols D, Caspi A, Harrington H, Grisham JR, Moffitt TE, et al. Obsessions and compulsions in the community: prevalence, interference, help-seeking, developmental stability, and co-occurring psychiatric conditions. Am J Psychiatr. 2009;166(3):329–36.
7. Valleni-Basile LA, Garrison CZ, Waller JL, Addy CL, McKeown RE, Jackson KL, et al. Incidence of obsessive-compulsive disorder in a community sample of young adolescents. J Am Acad Child Adolesc Psychiatry. 1996;35(7):898–906.
8. Mathis MA, Alvarenga PD, Funaro G, Torresan RC, Moraes I, Torres AR, et al. Gender differences in obsessive-compulsive disorder: a literature review. Braz J Psychiatry. 2011;33(4):390–9.
9. •• Fineberg NA, Hengartner MP, Bergbaum CE, Gale TM, Gamma A, Ajdacic-Gross V, et al. A prospective population-based cohort study of the prevalence, incidence and impact of obsessive-compulsive symptomatology. Int J Psychiatry Clin Pract. 2013;17(3):170–8 **30-year longitudinal cohort study investigating prevalence and correlates of OCD and OCS among the general adult population of Zurich, Switzerland.**
10. Angst J, Gamma A, Endrass J, Goodwin R, Ajdacic V, Eich D, et al. Obsessive-compulsive severity spectrum in the community: prevalence, comorbidity, and course. Eur Arch Psychiatry Clin Neurosci. 2004;254(3):156–64.
11. Ruscio AM, Stein DJ, Chiu WT, Kessler RC. The epidemiology of obsessive-compulsive disorder in the National Comorbidity Survey Replication. Mol Psychiatry. 2010;15(1):53–63.
12. • Politis S, Magklara K, Petrikis P, Michalis G, Simos G, Skapinakis P. Epidemiology and comorbidity of obsessive–compulsive disorder in late adolescence: a cross-sectional study in senior high schools in Greece. Int J Psychiatry Clin Pract. 2017;21(3):188–94 **Large cross-sectional study investigating prevalence and correlates of OCD and OCS among high school students in Greece.**
13. • Vivan AD, Rodrigues L, Wendt G, Bicca MG, Braga DT, Cordioli AV. Obsessive-compulsive symptoms and obsessive-compulsive disorder in adolescents: a population-based study. Rev Bras Psiquiatr. 2014;36(2):111–8 **Large cross-sectional study investigating prevalence and correlates of OCS among high school students in Brazil, 75 of whom met diagnostic criteria for OCD.**
14. Geller DA. Obsessive-compulsive and spectrum disorders in children and adolescents. Psychiatr Clin. 2006;29(2):353–70.
15. Mancebo MC, Garcia AM, Pinto A, Freeman JB, Przeworski A, Stout R, et al. Juvenile-onset OCD: Clinical features in children, adolescents and adults. Acta Psychiatr Scand. 2008;118(2):149–59.
16. Rasmussen SA, Eisen JL (1990) Epidemiology of obsessive compulsive disorder. J Clin Psychiatr. 1990;51(2):10–13.
17. Flament M. Epidemiology of obsessive-compulsive disorder in children and adolescents. L'Encephale. 1990;16:311–6.
18. Valleni-Basile LA, Garrison CZ, Jackson KL, Waller JL, McKeown RE, Addy CL, et al. Frequency of obsessive-compulsive disorder in a community sample of young adolescents. J Am Acad Child Adolesc Psychiatry. 1994;33(6):782–91.
19. •• Alvarenga PG, Cesar RC, Leckman JF, Moriyama TS, Torres AR, Bloch MH, et al. Obsessive-compulsive symptom dimensions in a population-based, cross-sectional sample of school-aged children. J Psychiatr Res. 2015;62:108–14 **Large cross-sectional study investigating the prevalence, correlates, and familial aggregation of OCS among children (ages 6-12) and their families in Brazil.**
20. Murray CJ, Lopez AD, World Health Organization. The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020: summary. Cambridge, MA: Harvard School of Public Health on behalf of the World Health Organization and the World Bank. 1996.
21. Stewart SE, Geller DA, Jenike M, Pauls D, Shaw D, Mullin B, et al. Long-term outcome of pediatric obsessive–compulsive disorder: a meta-analysis and qualitative review of the literature. Acta Psychiatr Scand. 2004;110(1):4–13.
22. •• Torresan RC, Ramos-Cerqueira AT, Shavitt RG, do Rosário MC, de Mathis MA, Miguel EC, et al. Symptom dimensions, clinical course and comorbidity in men and women with obsessive-compulsive disorder. Psychiatry Res. 2013;209(2):186–95 **Large cross-sectional study investigating gender differences, clinical features, and comorbidity patterns among adults with OCD.**
23. Kenyon KM, Eaton WO. Age at child obsessive-compulsive disorder onset and its relation to gender, symptom severity, and family functioning. Arch Sci Psychology. 2015;3(1):150–8.
24. Brakoulias V, Starcevic V, Berle D, Milicevic D, Moses K, Hannan A, et al. The characteristics of unacceptable/taboo thoughts in obsessive–compulsive disorder. Compr Psychiatry. 2013;54(7):750–7.
25. Williams MT, Farris SG. Sexual orientation obsessions in obsessive–compulsive disorder: prevalence and correlates. Psychiatry Res. 2011;187(1–2):156–9.
26. Zambaldi CF, Cantilino A, Montenegro AC, Paes JA, de Albuquerque TL, Sougey EB. Postpartum obsessive-compulsive

disorder: prevalence and clinical characteristics. Compr Psychiatry. 2009;50(6):503–9.
27. Raines AM, Oglesby ME, Allan NP, Mathes BM, Sutton CA, Schmidt NB. Examining the role of sex differences in obsessive-compulsive symptom dimensions. Psychiatry Res. 2018;259:265–9.
28. Hofmeijer-Sevink MK, van Oppen P, van Megen HJ, Batelaan NM, Cath DC, van der Wee NJ, et al. Clinical relevance of comorbidity in obsessive compulsive disorder: the Netherlands OCD Association study. J Affect Disord. 2013;150(3):847–54.
29. Lochner C, Fineberg NA, Zohar J, Van Ameringen M, Juven-Wetzler A, Altamura AC, et al. Dell'Osso B. Comorbidity in obsessive–compulsive disorder (OCD): a report from the International College of Obsessive–Compulsive Spectrum Disorders (ICOCS). Compr Psychiatry. 2014;55(7):1513–9.
30. Fineberg NA, Hengartner MP, Bergbaum C, Gale T, Rössler W, Angst J. Lifetime comorbidity of obsessive-compulsive disorder and sub-threshold obsessive-compulsive symptomatology in the community: impact, prevalence, socio-demographic and clinical characteristics. Int J Psychiatry Clin Pract. 2013;17(3):188–96.
31. Peris TS, Rozenman M, Bergman RL, Chang S, O'Neill J, Piacentini J. Developmental and clinical predictors of comorbidity for youth with obsessive compulsive disorder. J Psychiatr Res. 2017;93:72–8.
32. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-5). Washington, DC: American Psychiatric Pub. 2013.
33. Guzick AG, Cooke DL, Gage N, McNamara JP. CBT-plus: a meta-analysis of cognitive behavioral therapy augmentation strategies for obsessive-compulsive disorder. J Obsessive Compuls Relat Disord. 2018;19:6–14.
34. Foa EB, Yadin E, Lichner TK. Exposure and response (ritual) prevention for obsessive compulsive disorder: therapist guide. New York, NY: Oxford University Press. 2012.
35. Öst LG, Riise EN, Wergeland GJ, Hansen B, Kvale G. Cognitive behavioral and pharmacological treatments of OCD in children: a systematic review and meta-analysis. J Anxiety Disord. 2016;43:58–69.
36. Pediatric OC. Cognitive-behavior therapy, sertraline, and their combination for children and adolescents with obsessive-compulsive disorder: the Pediatric OCD Treatment Study (POTS) randomized controlled trial. JAMA. 2004;292(16):1969.
37. Brennan BP, Lee C, Elias JA, Crosby JM, Mathes BM, Andre MC, et al. Intensive residential treatment for severe obsessive-compulsive disorder: characterizing treatment course and predictors of response. J Psychiatr Res. 2014;56:98–105.
38. Knopp J, Knowles S, Bee P, Lovell K, Bower P. A systematic review of predictors and moderators of response to psychological therapies in OCD: do we have enough empirical evidence to target treatment? Clin Psychol Rev. 2013;33(8):1067–81.
39. Koran LM, Hanna GL, Hollander E, Nestadt G, Simpson HB, American Psychiatric Association. Practice guideline for the treatment of patients with obsessive-compulsive disorder. Am J Psychiatry. 2007;164(7 Suppl):5–3.
40. Eisen JL, Pinto A, Mancebo MC, Dyck IR, Orlando ME, Rasmussen SA. A 2-year prospective follow-up study of the course of obsessive-compulsive disorder. J Clin Psychiatry. 2010;71(8):1033–9.
41. Eisen JL, Sibrava NJ, Boisseau CL, Mancebo MC, Stout RL, Pinto A, et al. Five-year course of obsessive-compulsive disorder: predictors of remission and relapse. J Clinical Psychiatry. 2013;74(3):233–9.
42. Nicolini H, Salin-Pascual R, Cabrera B, Lanzagorta N. Influence of culture in obsessive-compulsive disorder and its treatment. Curr Psychiatr Rev. 2017;13(4):285–92.
43. Yang C, Nestadt G, Samuels JF, Doerfler LA. Cross-cultural differences in the perception and understanding of obsessive-compulsive disorder in East Asian and Western cultures. Int J Cult Ment Health. 2018;15:1.
44. Fontenelle LF, Mendlowicz MV, Versiani M. The descriptive epidemiology of obsessive–compulsive disorder. Prog Neuro-Psychopharmacol Biol Psychiatry. 2006;30(3):327–37.
45. Labad J, Menchón JM, Alonso P, Segalàs C, Jiménez S, Vallejo J. Female reproductive cycle and obsessive-compulsive disorder. J Clin Psychiatry. 2005;66(4):428–35.
46. Russell EJ, Fawcett JM, Mazmanian D. Risk of obsessive-compulsive disorder in pregnant and postpartum women: a meta-analysis. J Clin Psychiatry. 2013;74(4):377–85.
47.•• Reimer AE, de Oliveira AR, Diniz JB, Hoexter MQ, Miguel EC, Milad MR, et al. Fear extinction in an obsessive-compulsive disorder animal model: Influence of sex and estrous cycle. Neuropharmacology. 2018;131:104–15 **Animal study investigating the impact of neurotransmitters and gonadal hormones on rodent grooming behavior and fear extinction.**