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ORIGINAL ARTICLE

Obsessive-compulsive symptoms and obsessive-compulsive disorder in adolescents: a population-based study

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Objectives: To estimate the prevalence of obsessive-compulsive symptoms (OCS) and disorder (OCD) among adolescents and to describe OCD characteristics according to gender.
Methods: Participants were selected by cluster sampling at seven high-schools in southern Brazil. In the first stage, 2,323 students were screened for OCS; in the second stage, adolescents scoring $\geqslant 21$ on the OCI-R scale were individually interviewed. OCD diagnosis was established using a semi-structured interview (Schedule for Affective Disorders and Schizophrenia for School Aged Children: Present and Lifetime Version – K-SADS-PL).
Results: The past-month estimated prevalence of OCS was 18.3%, and the point estimated prevalence of OCD, 3.3%. Girls showed higher scores (OCS: 24.8 vs. 14.4%; OCD: 4.9 vs. 1.4%; $p < 0.001$). Only 9.3% of OCD adolescents had been diagnosed and 6.7% received treatment. The most frequent/severe DY-BOCS dimensions were miscellaneous (86.7%; mean score 6.3 ± 3.8) and symmetry (85.3%; 5.9 ± 3.8). Female OCD adolescents predominantly showed depression ($p = 0.032$), and male adolescents, tic disorders ($p = 0.006$).
Conclusions: OCD is underdiagnosed in adolescents, and few are treated. Future studies should investigate the relationship between OCS and the onset of OCD.

Keywords: Obsessive-compulsive disorder; obsessive-compulsive symptoms; adolescents; epidemiology; gender

Introduction

Obsessive-compulsive disorder (OCD) is characterized by obsessions and/or compulsions. Obsessions are recurrent, intrusive, unwanted thoughts, images, or urges that cause marked anxiety or distress. Compulsions are repetitive ritualistic behaviors or mental acts performed to prevent or reduce anxiety or distress.[1] OCD is a chronic disorder that negatively affects the lives of patients: people with the disorder tend to be divorced and unemployed, to have a low socioeconomic status, and to more often use health care services when compared with the general population. The great amounts of time spent performing rituals and engaging in family discord seem to further contribute toward patient suffering and a poor quality of life.[2,3]

Until the 1980s, OCD was considered to be a rare condition, with studies estimating prevalence rates as low as 0.05%. In 1988, the Epidemiological Catchment Area Study (ECA) reported a lifetime prevalence of OCD between 1.9 and 3.3%.[3] Since then, several epidemiological studies have recorded variable prevalence rates, ranging from 0.3 to 3.2% in adult populations.[4,5]

In addition to affecting adults, OCD also interferes with the lives of children and adolescents. In over 50% of adults with OCD, the onset of symptoms occurred in childhood.[6] The prevalence of OCD among children and adolescents has been found to be much higher than initially thought, reaching up to 4% in some populations.[7] Furthermore, it has been suggested that late adolescence is a period of increased vulnerability to the development of OCD.[7]

Despite the extensive literature on OCD, the prevalence of the disorder in children and adolescents is not well established. In addition to the limited number of population-based studies designed to investigate the prevalence of OCD in adolescents, the findings available are diverse and somewhat conflictive, probably as a result of heterogeneous study designs, sample characteristics, different recruitment and evaluation settings, use of different diagnostic instruments, and variable technical expertise of interviewers.[8] Moreover, OCD prevalence rates usually refer only to the full-blown version of the disorder, not taking into consideration the relevant role of subsyndromal obsessions and compulsions,[8] or obsessive-compulsive symptoms (OCS). To the authors' knowledge, no previous study has assessed

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OCS and OCD specifically among adolescent students in Brazil. With regard to gender, whereas OCD similarly affects adult males and females, with a slight female predominance, in childhood and adolescence prevalence tends to be higher among male individuals, possibly as a result of an earlier disease onset in boys.[9]

The clinical manifestations of OCD are very heterogeneous, with significant symptomatic variations. Patients often present more than one type of symptom. For example, in adolescents with OCD, the symptoms most frequently observed are contamination and aggressive obsessions and cleaning and checking compulsions.[6,10] In this sense, a great deal of effort has been devoted to developing dimensional models that can help improve OCD diagnosis and treatment. However, up to the present moment, no consensus has been reached with regard to the dimensions comprising the disorder.

Early-onset OCD tends to present a higher incidence of comorbidities, especially tic disorders, attention deficit hyperactivity disorder, and disruptive disorders.[11] The presence of comorbidities may increase the severity of symptoms and significantly affect the prognosis of patients with OCD.[12]

The objectives of this study were: 1) to estimate the prevalence of OCS and OCD in a sample of adolescent students; and 2) to investigate demographic and clinical characteristics of subjects with OCD according to gender.

Methods

This study was approved by the Research Ethics Committee of Hospital de Clínicas de Porto Alegre, Porto Alegre, RS, Brazil. All patients and guardians received an informed dissent form; those who did not wish to be included in the research were required to sign and return the form to the investigators.

Participants and procedures

Participants were recruited using cluster sampling. Our cluster comprised seven (five public, two private) high schools located in the municipality of Porto Alegre, southern Brazil. According to 2008 School Census results published by the state of Rio Grande do Sul Education Department, the total number of high school students in the city at the time of the study was 40,378. Sample size was calculated taking into consideration a 0.6% absolute error, a 95% confidence level, and a OCD prevalence of 2%. As a result, minimum sample size was determined at 1,989 students.

This two-stage epidemiological study was conducted between May 2009 and August 2011, with a focus on the prevalence of OCS and OCD and on sociodemographic and clinical variables. In the first stage of the study, a total of 2,323 students were screened for OCS. All participants attended a 15-minute lecture delivered by a trained psychologist and were asked to complete a demographic form and the Obsessive-Compulsive Inventory – Revised (OCI-R).

After screening, adolescents who obtained an OCI-R score equal to or greater than 21 (n=424) were interviewed individually for the establishment of OCD diagnosis. The cutoff point of the American/original version of the scale ($\geqslant$ 21) was used because no cutoff has been established for Brazilian populations.[13] Presence of a parent or guardian was mandatory at this stage.

Simultaneously, a sample of adolescents (n=150) with OCI-R scores below 21 was randomly selected and interviewed to confirm the absence of OCD. This measure was taken to control for the quality of responses (false-negative results) and also because we did not know how Brazilian adolescents would respond to the cutoff score of the American version.

Interviews were conducted either at a university hospital (Hospital de Clínicas de Porto Alegre) or at the adolescent's home. In order to avoid dropouts, participants who refused to attend the interviews in person were interviewed by telephone. Of these, only one was diagnosed with OCD, but refused to participate in the study. All participants diagnosed with OCD were evaluated with regard to demographic and clinical characteristics. Also, all students diagnosed with OCD in the study were offered treatment (cognitive-behavioral group therapy).

In order to guarantee a standardized application of instruments, experienced psychologists were trained by the principal investigator, who had previously undergone training and participated in the data collection of a large multicenter study on OCD conducted in Brazil.[14] Also, each professional participated in at least three assessments, followed by discussions regarding the application process and data agreement. All protocols were extensively revised by the lead investigator, so as to detect possible flaws or inconsistencies (whenever necessary, the adolescent was re-interviewed).

In the second stage of the study, 74 adolescents were diagnosed with OCD in the group of interviewees with OCI-R scores equal to or greater than 21. Two other adolescents were identified as having false-negative diagnoses (i.e., scored $<$ 21 but were diagnosed with OCD during the interview), and one adolescent dropped out, resulting in a final sample of 75 subjects with OCD. Figure 1 describes the participation of subjects in the study.

The total initial sample (2,323 subjects) was aged 14 to 17 years; 1,235 adolescents (53.2%) were female. Overall mean age was 15.6$\pm$1.0 years. The 75 participants diagnosed with OCD had a mean age of 16.2$\pm$1.1 years and they were predominantly female (n=59, 78.7%).

Measures

Screening instrument

Obsessive-Compulsive Inventory – Revised (OCI-R)

OCI-R is a revision of the original scale OCI, developed to assess the presence and severity of different OCS.[13] The

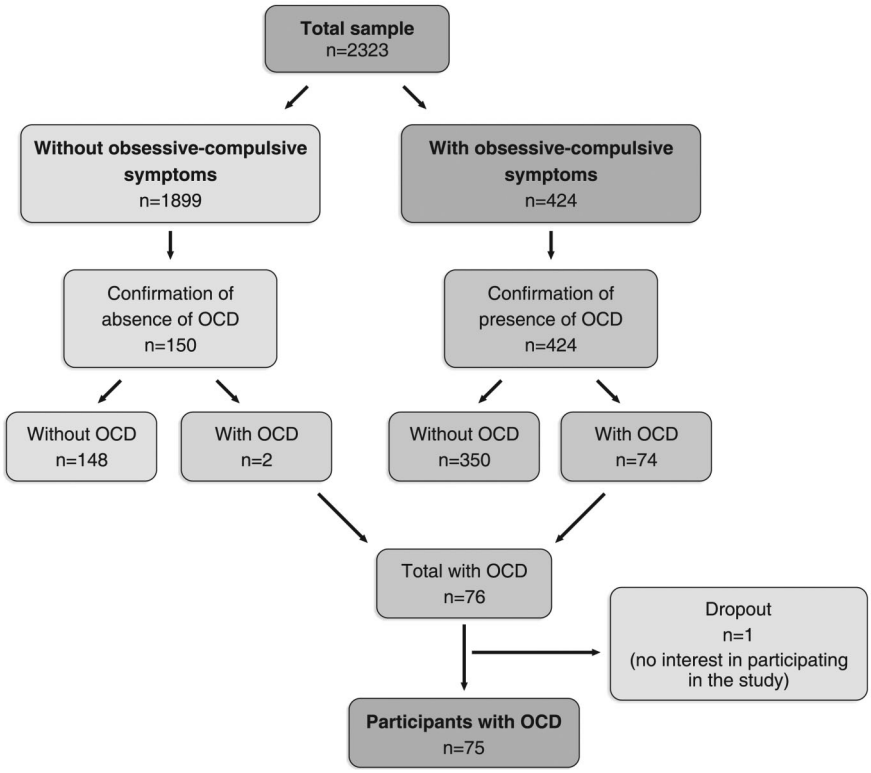

Figure 1 Flowchart showing the participation of subjects throughout the study. OCD = obsessive-compulsive disorder.

self-report OCI-R includes 18 statements that should be rated from 0 (not at all) to 4 (extremely). The scale was translated and adapted into Brazilian Portuguese and presented psychometric properties similar to those of the original version, with good internal consistency (Cronbach's alpha = 0.83) and a significant association with Yale-Brown Obsessive-Compulsive Scale (Y-BOCS) results ($r = 0.47$; $p < 0.001$).[15]

Assessment instruments

Sociodemographic form

Sociodemographic data were collected using a questionnaire specifically designed for the present study. Socieconomic status was assessed according to criteria of the Brazilian Association of Market Research Institutes (Associação Brasileira dos Institutos de Pesquisa de Mercado, ABIPEME).

Schedule for Affective Disorders and Schizophrenia for School Aged Children: Present and Lifetime Version (K-SADS-PL)

The Brazilian version of the K-SADS-PL was used to confirm diagnosis of OCD and to identify the presence of comorbidities. The K-SADS-PL is a semi-structured psychiatric interview designed to assess psychiatric disorders in children and adolescents aged 6 to 18 years, according to DSM-IV.[1] This version had its content equivalence confirmed in relation to the original instrument and has shown excellent psychometric properties, including inter-examiner and test-retest agreement (kappa = 0.87-1.00).[16]

Structured Clinical Interview for DSM-IV (SCID-TCIm)

This semi-structured interview was designed to diagnose disorders included in axes I and II of the DSM-IV. We used only the module focusing on impulse control disorders (SCID-TCIm),[17] once the K-SADS-PL does not assess this type of disorder. A multicenter study carried out in Brazil using the SCID-TCIm showed inter-examiner reliability rates as high as 96%.[14]

Yale-Brown Obsessive-Compulsive Scale (Y-BOCS)

This instrument was used to assess the severity of OCS. The scale includes 10 items, five for obsessions and five for compulsions. Each item can be rated from 0 (none) to 4 (extreme) in relation to time, impairment, frequency, control, and discomfort. The scale is widely used worldwide and has good psychometric properties, with good inter-rater reliability (ICC = 0.98) and internal consistency (Cronbach's alpha ranging from 0.88 to 0.91).[18]

Clinical Global Impression – Severity Scale (CGI-S)

The CGI-S was used to assess the clinician's overall impression of the severity of different psychiatric disorders. The scale includes 7 items for the assessment of each disorder, which may range from 1 (normal or no symptom) to 7 (extremely severe symptoms).[19] The CGI

scale is a well-established research rating tool applicable to all psychiatric disorders.

Dimensional Yale-Brown Obsessive-Compulsive Scale (DY-BOCS)

The DY-BOCS allows to assess six different symptom dimensions, including obsessions and compulsions (aggression, sexual/religious, symmetry, contamination, hoarding, and miscellaneous). The severity of each dimension can be assessed independently with regard to time, level of anxiety, and interference with daily life. Scores may range from 0 to 5 (maximum of 15 points per dimension). The total impact of symptoms can also be quantified, at a maximum score of 30. The scale has been translated into Brazilian Portuguese and presented good inter-rater reliability (ICC $>$ 0.98) and internal consistency (Cronbach's alpha = 0.9). Moreover, the convergent validity of the scale has shown excellent correlation with the Y-BOCS ($r = 0.82$; $p < 0.001$).[20]

Beck Anxiety Inventory (BAI)

This instrument assesses the presence and severity of anxiety symptoms. It includes 21 statements that describe anxiety symptoms and can be rated from 0 (not at all) to 3 (severely) with regard to symptom severity. Beck inventories available in Brazilian Portuguese present good psychometric properties, with Cronbach's alpha accuracy rates ranging between 0.88 and 0.93. The scale has also shown correlation with the State-Trait Anxiety Inventory, with a significant relationship for both Trait Anxiety ($r = 0.78$; $p < 0.001$) and State Anxiety ($r = 0.76$; $p < 0.001$).[21]

Beck Depressive Inventory-II (BDI-II)

The BDI-II was used to assess depressive symptoms. This instrument includes 21 statements, with scores ranging from 0 to 3, which reflect increasing levels of severity for each symptom. The revised version, translated and adapted into Brazilian Portuguese, showed good psychometric performance in a sample of adolescents, with good internal consistency (Cronbach's alpha = 0.86) and construct validity.[22]

Statistical analysis

Continuous variables were expressed as means $\pm$ standard deviation, and categorical variables, as absolute and relative frequencies. Means were compared using the Student *t* test for independent samples; Fisher's exact or Pearson's chi-square tests were used to compare proportions. Significance was set at 5% ($p \leqslant 0.05$). Data were stored and analyzed in SPSS version 17.0.

Results

Prevalence

Overall past month estimated prevalence of OCS (OCI-R score $\geqslant$ 21) was 18.3%, and it was higher in girls (24.8%) than in boys (14.4%) ($p < 0.001$). Overall point prevalence of OCD was estimated at 3.3%, again with higher scores for girls (4.9 vs. 1.4%) ($p < 0.001$). Figure 2 shows the distribution of OCS and OCD according to gender.

Sociodemographic and clinical features of students with OCD

The 75 participants diagnosed with OCD were predominantly white (85.3%) and came from different socioeconomic classes. Mean age at the onset of symptoms was 9.7$\pm$3.4 years, and at the onset of the disorder, 13.8$\pm$2.4 years. Only 7 participants (9.3%) were aware of their diagnosis, and only 5 (6.7%) had received treatment for OCD. Also, 20% of the participants had attempted suicide at least once, and 9.3% presented current suicidal ideation.

The following mean scores were obtained with the different diagnostic instruments employed: Y-BOCS, 21.1$\pm$4.1; CGI, 3.8$\pm$0.7; BAI, 17.8$\pm$10.9; and BDI-II, 20.8$\pm$11.5. BDI-II scores showed the only significant difference between girls and boys, with girls scoring higher ($p = 0.032$) (Table 1).

Symptom dimensions

According to the results of the DY-BOCS, the most frequent symptom dimensions in our sample of students with OCD were miscellaneous (86.7%) and symmetry (85.3%). These two dimensions were also the ones with the highest scores, namely 6.3$\pm$3.8 for miscellaneous and 5.9$\pm$3.8 for symmetry. The mean global score of the DY-BOCS was 16.9$\pm$5.0. No significant differences were observed between boys and girls (Table 2).

Comorbidities

Most participants (56%) presented at least one comorbid disorder in addition to OCD (mean $\pm$ standard deviation: 1.0$\pm$1.1). The comorbidities most commonly reported were major depressive disorder (17.3%), generalized

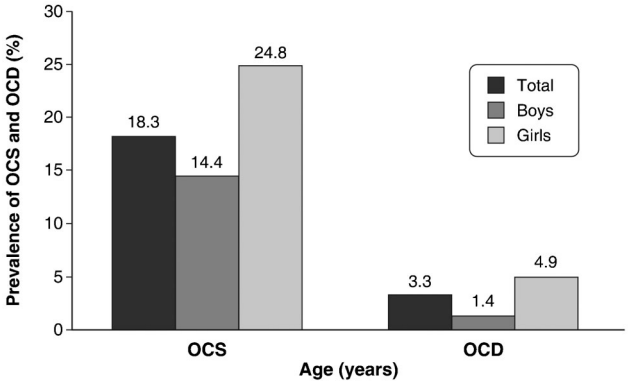

Figure 2 Distribution of obsessive-compulsive symptoms and disorder according to gender. OCD = obsessive-compulsive disorder; OCS = obsessive-compulsive symptoms.

Table 1 Sociodemographic and clinical features of students with obsessive-compulsive disorder according to gender

Variables	Total (n=75)	Boys (n=16)	Girls (n=59)	p-value
Age (years), mean ± SD	16.2±1.1	16.3±0.7	16.1±1.2	0.570*
Skin color, n (%)				1.000†
White	64 (85.3)	14 (87.5)	50 (84.7)	
Non-white	11 (14.7)	2 (12.5)	9 (15.3)	
Socioeconomic class, n (%)				0.825‡
A/B	38 (50.6)	9 (56.3)	29 (49.2)	
C/D	37 (49.4)	7 (43.8)	30 (50.8)	
Age at onset of OCS, mean ± SD	9.7±3.4	9.6±3.7	9.7±3.3	0.970*
Age at onset of OCD, mean ± SD	13.8±2.4	14.3±1.8	13.6±2.6	0.299*
Prior knowledge of OCD, n (%)	7 (9.3)	2 (12.5)	5 (8.5)	0.637†
Previous treatment, n (%)	5 (6.7)	1 (6.3)	4 (6.8)	1.000†
Suicide attempt, n (%)	15 (20.0)	3 (18.8)	12 (20.3)	1.000†
Suicidal ideation (current), n (%)	7 (9.3)	2 (12.5)	5 (8.5)	0.637†
Y-BOCS, mean ± SD	21.1±4.1	20.4±3.0	21.3±4.4	0.429*
Obsessions	10.1±2.4	9.9±1.9	10.2±2.5	0.728*
Compulsions	10.9±2.8	10.4±2.6	11.1±2.8	0.378*
CGI, mean ± SD	3.8±0.7	3.8±0.8	3.9±0.7	0.636*
BAI, mean ± SD	17.8±10.9	14.8±8.9	18.7±11.4	0.205*
BDI-II, mean ± SD	20.8±11.5	16.1±8.7	22.1±11.9	0.032*

BAI = Beck Anxiety Inventory; BDI-II = Beck Depressive Inventory-II; CGI = Clinical Global Impression; OCS = obsessive-compulsive symptoms; OCD = obsessive-compulsive disorder; SD = standard deviation; Y-BOCS = Yale-Brown Obsessive-Compulsive Scale.
* Student's t test;
† Fisher's exact test;
‡ Chi-square test.

Table 2 Symptom dimensions (frequency and DY-BOCS scores) according to gender

Variables	Total (n=75)	Boys (n=16)	Girls (n=59)	p-value
Frequency, n (%)				
Aggression	51 (68)	12 (75)	39 (66.1)	0.708*
Sexual/Religious	35 (46.7)	9 (56.3)	26 (44.1)	0.559*
Symmetry	64 (85.3)	12 (75)	52 (88.1)	0.233†
Contamination	48 (64)	11 (68.8)	37 (62.7)	0.879*
Hoarding	56 (74.7)	12 (75)	44 (74.6)	1.000†
Miscellaneous	65 (86.7)	14 (87.5)	51 (86.4)	1.000†
DY-BOCS Scores, mean ± SD				
Global Score	16.9±5.0	16.4±5.0	17.0±5.1	0.711‡
Aggression	4.8±4.2	5.4±3.9	4.6±4.2	0.475‡
Sexual/Religious	2.9±3.7	4.2±4.5	2.5±3.4	0.102‡
Symmetry	5.9±3.8	4.7±3.8	6.2±3.8	0.162‡
Contamination	4.4±4.0	4.9±3.9	4.3±4.0	0.543‡
Hoarding	4.1±3.3	3.1±2.5	4.3±3.5	0.111‡
Miscellaneous	6.3±3.8	5.3±3.4	6.5±3.9	0.257‡

DY-BOCS = Dimensional Yale-Brown Obsessive-Compulsive Scale; SD = standard deviation.
* Chi-square test;
† Fisher's exact test;
‡ Student's t test.

anxiety disorder (12%), specific phobia (9.3%), and skin picking (9.3%). Only tic disorders showed significant sex differences: they were present in 6.7% of the whole sample of OCD individuals, however significantly more frequent in boys (25%) than in girls (1.7%) (p = 0.006). Table 3 lists all the comorbidities found in our sample of OCD students.

Discussion

The past month prevalence of OCS in our sample of high school students was 18.3%, very similar to the rate reported in a previous American study that assessed 3,283 adolescents and found an OCS rate of 19%.[23] Another investigation undertaken in Egypt and involving secondary school and university students found a higher prevalence of OCS, of 26.2%; that study included adolescents and young adults aged up to 24 years.[24] Conversely, other studies have reported lower rates, for example 11.2% among Iranian adolescents,[25] or 12.3% in an Italian study assessing an exclusively male sample.[26] However, none of the above-mentioned studies used the OCI-R as a screening tool, which may probably have contributed to the differences observed. Another important factor to be considered is related to the definition of OCS. Different attempts have been made to define OCS, and the only consensus among the definitions available is related to the severity of symptoms, i.e., symptoms should not be severe enough to meet OCD criteria.

With regard to the current prevalence of OCD among adolescents, the rate found in our study (3.3%) is close to

Table 3 Comorbidities with obsessive-compulsive disorder according to gender, n (%)

Variables	Total (n=75)	Boys (n=16)	Girls (n=59)	p-value
Presence of any comorbid disorder	42 (56.0)	9 (56.3)	33 (55.9)	1.000*
No. of comorbidities, mean ± SD	1.0±1.1	1.3±1.3	0.9±1.0	0.250†
Affective disorders	16 (21.3)	3 (18.8)	13 (22.0)	1.000‡
Major depressive disorder	13 (17.3)	1 (6.3)	12 (20.3)	0.276‡
Bipolar disorder	3 (4.0)	2 (12.5)	1 (1.7)	0.113‡
Anxiety disorders	19 (25.3)	4 (25.0)	15 (25.4)	1.000‡
Specific phobia	7 (9.3)	0 (0.0)	7 (11.9)	0.334‡
Social phobia	3 (4.0)	1 (6.3)	2 (3.4)	0.519‡
Panic disorder	2 (2.7)	1 (6.3)	1 (1.7)	0.383‡
Generalized anxiety disorder	9 (12,0)	2 (12.5)	7 (11.9)	1.000‡
Post-traumatic stress disorder	2 (2.7)	1 (6.3)	1 (1.7)	0.383‡
Impulse control disorders	16 (21.3)	4 (25.0)	12 (20.3)	0.735‡
Trichotillomania	5 (6.7)	2 (12.5)	3 (5.1)	0.288‡
Skin picking	7 (9.3)	2 (12.5)	5 (8.5)	0.637‡
Kleptomania	1 (1.3)	0 (0.0)	1 (1.7)	1.000‡
Impulsive-compulsive buying disorder	1 (1.3)	0 (0.0)	1 (1.7)	1.000‡
Impulsive-compulsive internet usage disorder	3 (4.0)	1 (6.3)	2 (3.4)	0.519‡
Video game use disorder	2 (2.7)	0 (0.0)	2 (3.4)	1.000‡
Attention deficit hyperactivity disorder	6 (8.0)	2 (12.5)	4 (6.8)	0.602‡
Tic disorders	5 (6.7)	4 (25.0)	1 (1.7)	0.006‡
Chronic tic disorder	3 (4.0)	3 (18.8)	0 (0.0)	0.008‡
Tourette's disorder	2 (2.7)	1 (6.3)	1 (1.7)	0.383‡
Other disorders	4 (5.3)	1 (6.3)	3 (5.1)	1.000‡

SD = standard deviation.
* Chi-square test;
† Student's t test;
‡ Fisher's exact test.

the findings reported by Zohar et al.[27] and Valleni-Basile et al.,[23] who found rates of 3.6 and 3%, respectively. Both studies assessed adolescents only, and Valleni-Basile et al.[23] also adopted a two-stage approach, using K-SADS to diagnose OCD. Notwithstanding, other authors have described slightly higher rates, of up to 4.2%.[28,29] The latter studies were designed to investigate the presence of OCD in the past year and lifetime OCD, respectively (both included college students), and the age of participants was higher than in our sample. Other studies, in turn, have reported lower rates, e.g., the first epidemiological study on the prevalence of OCD among adolescents, by Flament et al.,[30] which estimated a 1% prevalence of the disorder at the time of evaluation. However, Flament et al. used a smaller sample (356 adolescents), and diagnosis was established using DSM-III criteria.[30]

With regard to the prevalence of OCS and OCD in boys vs. girls, a significantly higher number of girls was found in the two groups ($p < 0.001$). Differently from previous studies conducted with children, in which boys showed higher rates of OCD than girls, research focusing on adolescent tends to find similar results for males and females, for both OCD and OCS.[23,25] Notwithstanding, one previous study has also found higher prevalence rates among girls, similarly to our study: Van Grootheest et al. assessed adolescent twins aged 12, 14, and 16 years, and found a higher prevalence of OCS in girls aged 14 ($p < 0.001$) and 16 years ($p < 0.001$); 12-year old adolescents, in turn, did not show gender differences ($p = 0.54$).[31] One factor that remains underinvestigated and that may potentially influence OCS and OCD findings is the role of female sex hormones. After menarche, the prevalence of females diagnosed with OCD strongly increases, suggesting a potential role of these hormones in the development of the disorder. Labad et al.,[32] while assessing the relationship between events of the female reproductive cycle and OCD, found that OCD onset occurred in the same year as menarche in 22% of the individuals assessed. Mean age at menarche in the Brazilian population is known to be around 13.2 years,[33] which suggests that most of the girls included in our study had already menstruated.

Our adolescents had a mean age of 9.7 years at the onset of OCS and of 13.8 years at the onset of OCD. However, strikingly, only 9.3% were aware of their condition, and only 6.7% had already sought treatment. This result is compatible with the long time often elapsed between the onset of symptoms and the search for assistance, as long as 18.1 years in an adult sample.[14] Another important finding in our sample relates to the suffering caused by OCD, which may potentially have accounted for suicidal ideation and suicide attempt results. In our sample, 20% of the adolescents with OCD showed lifetime suicide attempts, and 9.3% showed current suicidal ideation. These findings are in accordance with previous studies that have shown suicide rates as high as 27% and current suicidal ideation rates of up to 28% in patients with OCD.[34] The high rates of comorbidity between OCD and major depressive disorder described in the literature and observed in our sample may explain, at least in part, the high levels of suicide attempts and suicidal ideation found in these populations.

The symptom dimensions with the greatest frequency and severity in our group of adolescents with OCD were miscellaneous and symmetry. This finding is similar to that of Rosário-Campos et al.,[20] who found higher prevalence and severity results for the dimensions

symmetry (86%, mean 6.7±3.9), followed by miscellaneous (85%, mean 6.2±3.8). Conversely, some previous studies involving children and adolescents suggest that the obsessions most commonly observed in this age group include contamination and aggressive thoughts, whereas the most frequent compulsions are cleaning and checking rituals.[6,10,24,28] This diversity of results possibly reflects the use of different instruments for the collection of data. In particular, except for the DY-BOCS, the authors of the present study are not aware of other scales covering the miscellaneous dimension. Only Rosário-Campos et al. have referred the use of the DY-BOCS.[20]

With regard to symptom dimensions, no significant differences were observed between sexes, contradicting other studies involving children and adolescents. Mataix-Cols et al.,[10] for example, found a higher frequency of sexual obsessions in boys and of hoarding rituals in girls. Although our findings also showed a stronger presence of the sexual/religious dimension in boys and of hoarding in girls, similarly to those authors, the small number of subjects diagnosed with OCD in our study may have influenced the absence of significant differences between males and females. Masi et al.,[11] in turn, observed that the dimensions related with ordering and symmetry were more common among males, whereas contamination and cleaning were more frequent in females. Torresan et al.[35] found significant differences with regard to sexual, religious and symmetry obsessions, in addition to mental rituals: all were more frequent in boys. Differences across studies probably reflect differences in methodological aspects, e.g., sample selection, instrument used, and patient age (the study by Torresan et al.,[35] for example, included adults).

Comorbidities with OCD were found in 56% of our sample. This rate is compatible with the literature, in which rates ranging from 51.7 to 85% can be found.[6,24,28,36] Major depressive disorder was the most prevalent comorbidity (17.3%), as also observed previously for children and adolescents.[6,23,28] With regard to impulse control disorders, skin picking was the most frequent one (9.3%). Grant et al. assessed the presence of impulse control disorders in children and adolescents with OCD and also pointed to skin picking as the most prevalent disorder in their sample (12.8%).[37]

In the analysis of comorbidities according to gender, tic disorders were found to be more prevalent in boys ($p = 0.006$), with no significant differences for the other disorders assessed. Other studies involving children and adolescents have also observed a higher prevalence of tic disorders in boys.[11,35,38] Conversely, one study has reported a higher frequency of attention deficit hyperactivity disorder in boys,[38] and another has observed more simple phobias, anorexia, compulsive buying, and skin picking in girls.[35] We believe that the small number of boys included in our sample may have affected our results, failing to reveal other significant associations.

Although we did not find differences between genders with regard to major depressive disorder, significant differences were found in the analysis of depressive symptoms with BDI-II, with higher scores among girls. Another study involving patients with OCD aged 10 to 72 years found similar results with BDI.[35] Considering previous evidence of significant differences for depression between genders,[39,40] a larger sample could probably have yielded similar results. Also, the scores obtained with BDI-II could reflect the presence of depressive symptoms secondary to OCD, rather than major depressive disorder according to DSM-IV.

The present study used a large population-based sample, from different socioeconomic levels, in the first stage of investigation (screening). We used a validated screening instrument, proven to possess adequate psychometric properties; in addition, individual diagnostic interviews were conducted by experienced health care professionals. Nevertheless, one important limitation of our study was the small number of participants with OCD included in the second stage. As a result, although some of the comparisons between genders suggested the presence of trends, no statistically significant differences were observed.

In summary, our findings allow to conclude that OCD is a common – but still underdiagnosed – psychiatric disorder among adolescents, and that only a small portion of patients receive adequate treatment. An increased availability of information campaigns directed to this age group would probably allow the early identification and treatment of the disease, contributing toward symptom relief and a better prognosis. Another important finding was the high prevalence of OCS. It remains unclear whether OCS represent an early stage of the clinical development of OCD, working as a predictor of the full-blown disorder, or whether it is a similar condition, however unrelated with the development of OCD. Longitudinal studies are warranted to investigate these hypotheses.

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Disclosure

The authors report no conflicts of interest.

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