Obsessive-Compulsive Spectrum Symptoms Are Associated With Functional Impairment in Children and Adolescents With Psychosis Risk Syndrome:

The CAPRIS Study

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Abstract

Objective: To compare clinical and functional variables among 3 groups of children and adolescents: subjects at clinical high risk for psychosis (CHR-P) who also have obsessive-compulsive symptoms (OCS), CHR-P patients without OCS, and healthy controls (HC).

Methods: A total of 128 CHR-P patients and 98 HC between the ages of 10 and 17 years were recruited as part of a multicenter prospective longitudinal study conducted in Spain between January 1, 2011, and December 31, 2018, with diagnoses made for CHR-P using the Scale of Prodromal Symptoms (SOPS). Two groups were obtained based on Leyton Obsessional Inventory–Child Version (LOI-CV) scores: 64 CHR-P patients with OCS (OCS+) and 64 CHR-P patients without OCS (OCS–). Clinical variables were analyzed with a generalized linear model.

Results: Overall, 128 CHR-P patients, 64 (50%) with OCS (mean ± SD age = 15.5 ± 1.4 years, 34.4% male), 64 CHR-P patients without OCS (mean ± SD age = 15.1 ± 1.9 years, 34.4% male), and 98 HC (mean ± SD age = 15.5 ± 1.5 years, 42.9% male), of whom 19 (19.5%) had OCS, were included. Generalized linear model analysis revealed significant differences between the groups. The OCS+ group showed more severe prodromal symptoms ($P = .007$), worse functioning at baseline ($P = .044$) and during the previous year ($P = .004$), and more dysmorphophobic symptoms ($P < .001$) compared to the OCS– group. OCS+ patients were also more frequently treated with antidepressants ($P = .004$) than were OCS– patients.

Conclusions: In our sample, among children and adolescents with CHR-P, the prevalence of OCS was high (50%). OCS+ subjects had a more severe clinical and functional profile than OCS– subjects. Early detection and treatment of these symptoms can lead to better outcomes for these patients.

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In recent decades, research concerning clinical high risk for psychosis (CHR-P) patients has focused on detection, prognosis, and intervention. Efforts to better understand the neurodevelopment of schizophrenia[1,2] have included attempts to detect individuals with CHR-P to facilitate early intervention[3] during the prepsychotic period, or "prodromal" stage.[4,5] From a prospective point of view, the course of CHR-P shows considerable heterogeneity, with positive symptoms, functioning, cognition, and negative and affective symptoms all following partly independent trajectories.[6] A meta-analysis[7] found that 25% of individuals at CHR-P developed psychosis within 3 years, and a systematic review focusing on children and adolescents[8] reported a 17%–20% rate of transition to psychosis during the first year, which is similar to what has been found in adults. The aforementioned meta-analysis[7] recorded that transition rates were associated with brief limited intermittent psychotic symptoms (BLIPS) and being male and found that the majority of CHR-P individuals who did not develop psychosis also did not recover. Another meta-analysis[9] showed that obsessive-compulsive

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Clinical Points

- Most research regarding clinical high risk for psychosis (CHR-P) and comorbid obsessive-compulsive symptoms (OCS) has focused on adults. This study is the first conducted with a child and adolescent sample.
- Subjects with CHR-P plus OCS are considered an especially susceptible group clinically in terms of functioning. Systematic evaluation of OCS symptoms would allow for effective treatments that can improve these patients' functioning and prognosis.

disorder (OCD) is fairly common in schizophrenia, with an estimated prevalence of 13.6% after meta-regression and a higher prevalence in chronic populations. The estimated prevalence of obsessive-compulsive symptoms (OCS) is 30.3% after meta-regression,[9] in comparison with 1.1%–1.8% among the general population.[10] The rate of OCD in adolescents with schizophrenia is 26%,[11] although many cases do not meet clinical criteria for OCD and are considered subclinical. The psychotic disorders that have been most commonly associated with OCD are schizophrenia followed by schizoaffective disorder and delusional disorder.[12] OCD and schizophrenia share the same etiologic risk factors: older age of the father, obstetric complications, and infections.[13–16]

Although few studies have focused on CHR-P and OCS, findings in adult patients have indicated that subjects with both of these factors have more positive and negative prodromal symptoms.[17,18] Some studies have also found more depressive symptoms,[17,19] while others have not.[18] None of the studies have found an association between OCS and patients' level of global functioning.[17,19] The prevalence of OCD in patients with CHR-P is between 5% and 8.1%, and between 11% and 35% if subclinical symptoms are included.[12,18,19] The prevalence of OCS among patients with CHR-P and a first episode of psychosis seems to be quite similar.[20] Up to now, no studies have focused exclusively on the child and adolescent population. The *DSM-5*[10] created a new chapter entitled "Obsessive-Compulsive Disorder and Related Disorders," which includes OCD and body dysmorphic disorder (BDD). This suggests a relationship between these disorders, although the association between BDD and CHR-P has not yet been determined.

The main objective of our study was to explore the clinical and functional differences between 3 groups of subjects: patients with CHR-P and OCS (OCS+), patients with CHR-P who do not have OCS (OCS–), and a group of healthy controls (HC). Our main hypothesis was that OCS+ subjects would show more clinical and functional impairment than OCS– subjects, who, in turn, would show more impairment than HC. Our second hypothesis was that the OCS+ group would present symptomatology that is more similar to BDD compared to the other groups.

METHODS

Subjects

This was a cross-sectional study undertaken as part of the Child and Adolescent Psychosis Risk Syndrome (CAPRIS) project, a longitudinal study that began in 2011 (study dates: January 1, 2011, through December 31, 2018). General baseline data for these patients have been published elsewhere.[21] CHR-P subjects were recruited through the inpatient and outpatient setting of the Child and Adolescent Psychiatry and Psychology Department of Hospital Clinic of Barcelona and Hospital Sant Joan de Déu (HSJD) (Barcelona, Spain). The HC were matched for age and gender. All children and adolescents were between 10 and 17 years old.

Inclusion criteria were derived from the ultra-high risk criteria set by Miller et al[22] along with the attenuated negative symptoms from the clinical high risk criteria established by Lencz et al[23] and the second-degree relative genetic risk criteria by Klosterkötter et al.[24] Inclusion criteria for the CHR-P group consisted of having one or more of the following included in the Scale of Prodromal Symptoms (SOPS):

1. Attenuated positive symptoms (APS), scored as 3 to 5 in the SOPS interview, starting in the previous 12 months or presenting current worsening of clinical symptoms.
2. Attenuated negative symptoms (ANS), identified as a score of 3 to 5 on the negative subscale of the SOPS, appearing in the previous 12 months or presenting current worsening of the clinical symptoms.
3. BLIPS, scored as 6 on the SOPS positive subscale, with a duration no longer than 1 week, and appearing in the previous 3 months.
4. Genetic risk (GR) criteria consisting of having a first- or second-degree relative with schizophrenia or having a diagnosis of schizotypal disorder plus functional decline (30% decrease in Global Assessment of Functioning [GAF] score in the previous year).

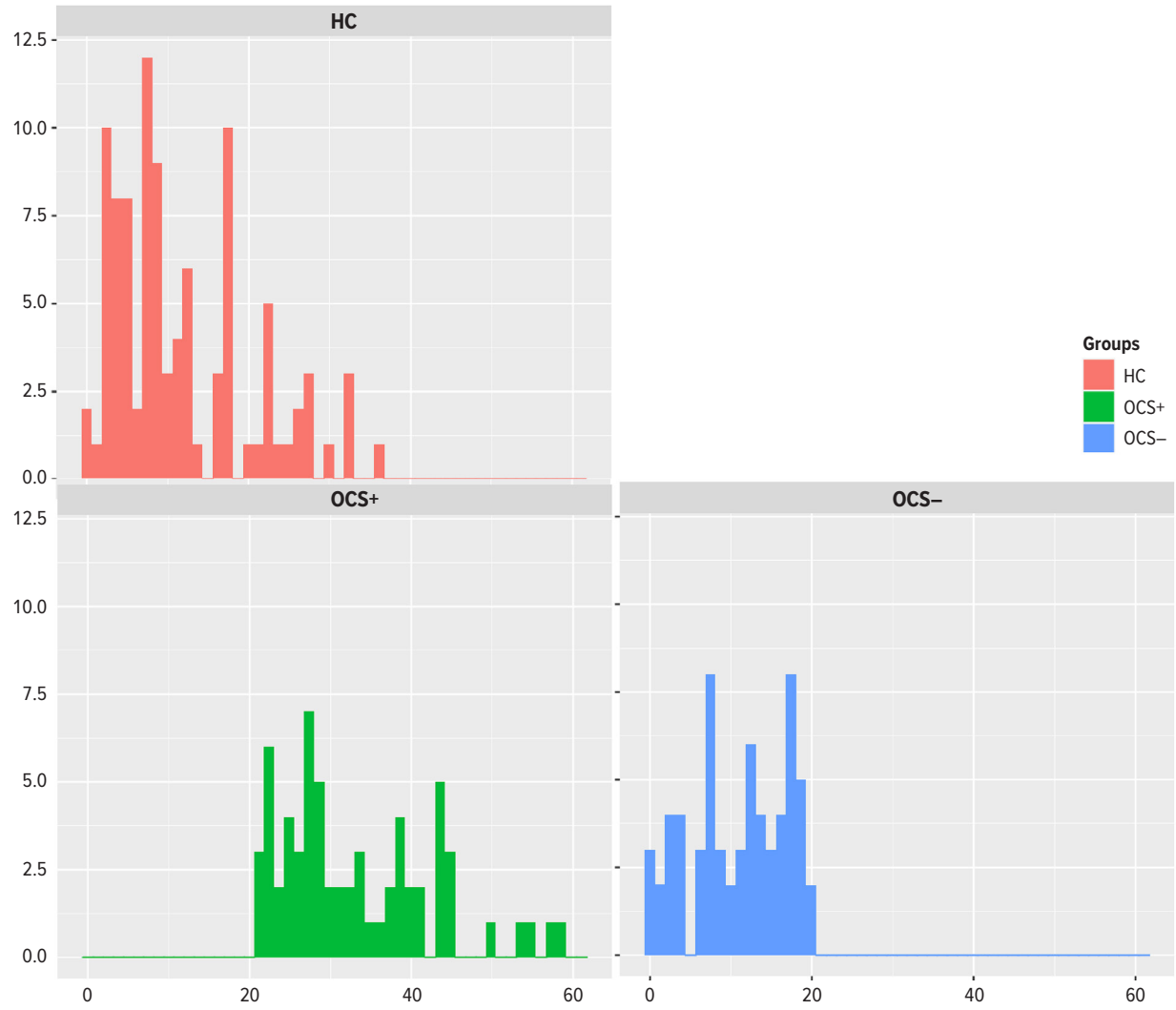
Exclusion criteria for all groups were (*a*) IQ below 70 with impaired functioning; (*b*) autism spectrum disorders; (*c*) neurologic disorders, including history of head trauma with loss of consciousness; (*d*) problems with language comprehension; and (*e*) any history of psychotic symptoms. Exclusion criteria for HC were having a psychiatric diagnosis according to *DSM-IV-TR* criteria and/or having a first- or second-degree relative with psychotic illness.

The study was approved by the Ethics Committee of each institution. All parents or legal guardians and all participants older than 12 years provided written informed consent.

Clinical Assessment

Prodromal symptoms were evaluated with the Semistructured Interview for Prodromal Syndromes (SIPS) and scored on the SOPS. The SOPS is a 19-item scale designed to assess the severity of prodromal

Figure 1.
Leyton Obsessional Inventory–Child Version (LOI-CV) Score Distribution[a]



[a]For each graph, LOI-CV score is shown in the x-axis and number of patients is shown in the y-axis.
Abbreviations: CHR-P = clinical high risk for psychosis, HC = healthy controls, OCS+ = CHR-P patients who scored positively on the LOI-CV, OCS– = CHR-P patients who scored negatively on the LOI-CV.

symptoms via 4 subscales: positive, negative, disorganize, and general symptoms.[25] Each item is rated on a scale of 0 (not present) to 6 (extreme or psychotic intensity). Items scored from 3 to 5 are considered prodromal.

Psychiatric diagnoses were obtained from the structured interview Kiddie Schedule for Affective Disorders and Schizophrenia, Present and Lifetime version (K-SADS-PL). This interview is considered a reliable and valid instrument to assess present and lifetime diagnosis[26] and has been validated in Spanish.[27,28]

All subjects were evaluated, with examination of their psychiatric history, prior and current treatments, the reason for their medical visit, their socioeconomic status, and relevant aspects of their personal and family background by means of an interview with the participants' parents or legal guardians. Socioeconomic status (SES) of the sample was estimated with the Hollingshead and Redlich scale.[29] Obstetric complications were registered using the Lewis-Murray scale.[30]

Functioning, both current and over the previous year, was evaluated with the GAF, which is scored from 1 to 100, indicating the general level of functioning and clinical symptomatology.[31] Higher scores indicate better functioning.

Affective symptomatology was evaluated using the Young Mania Rating Scale (YMRS) to assess manic symptoms[32] and the Hamilton Depression Rating Scale (HDRS) for depressive symptoms.[33]

The Leyton Obsessional Inventory–Child Version (LOI-CV)[34,35] questionnaire was used to evaluate OCS. This

Table 1.

Demographic and Clinical Characteristics of CHR-P Patients Who Have Obsessive-Compulsive Symptoms, CHR-P Patients Without Obsessive-Compulsive Symptoms, and Healthy Controls

Characteristic	OCS+ (n = 64)	OCS– (n = 64)	HC (n = 98)	t/χ^2	*P*[a]	Between-Group Comparisons, *P*		
						OCS+ vs HC	OCS– vs HC	OCS+ vs OCS–
Age, mean ± SD, y	15.5 ± 1.4	15.1 ± 1.9	15.5 ± 1.5	1.401	.248			
Male, n (%)	22 (34.4)	22 (34.4)	42 (42.9)	1.694	.429			
SES,[b] mean ± SD	34.8 ± 16	38.2 ± 19.2	50.3 ± 15.2	18.142	**<.001**[c]			
Pharmacologic treatment at baseline, n (%)	46 (71.9)	43 (67.2)	0 (0)	116.710	**<.001**	**<.001***	**<.001***	.588
Antipsychotics, n (%)	29 (45.3)	30 (46.9)	0 (0)	62.702	**<.001**	**<.001***	**<.001***	.858
Antidepressants, n (%)	36 (56.3)	19 (29.7)	0 (0)	68.049	**.001**	**<.001***	**<.001***	**.004***
Cannabis use, n (%)	25 (39.1)	14 (21.9)	18 (18.4)	0.788	.674	.691	.244	.139
Psychiatric history, n (%)	55 (85.9)	54 (84.4)	22 (22.4)	100.991	**<.001**	**<.001***	**<.001***	.917
Hospitalizations, n (%)	27 (42.2)	31 (48.4)	0 (0)	66.989	**<.001**	**<.001***	**<.001***	.785
Relatives' psychiatric history, n (%)	50 (78.1)	54 (84.4)	27 (27.6)	70.525	**<.001**	**<.001***	**<.001***	.520
Relatives with psychotic disorder, n (%)	32 (50)	43 (67.2)	0 (0)	89.879	**<.001**	**<.001***	**<.001***	.158

[a]Bonferroni correction for multiple comparisons applied; boldface indicates statistical significance.
[b]SES was measured using the Hollingshead and Redlich scale, which has 5 possible scores, from I (1) to V (5), with lower numbers indicating higher SES.
[c]OCS+ = OCS– < HC.
**P* value after the application of Bonferroni correction for multiple comparisons; boldface indicates statistical significance.
Abbreviations: CHR-P = clinical high risk for psychosis, HC = healthy controls, LOI-CV = Leyton Obsessive Inventory–Child Version, OCS+ = CHR-P patients who scored positively on the LOI-CV, OCS– = CHR-P patients who scored negatively on the LOI-CV, SES = socioeconomic status.

instrument includes 20 items that are used to determine two separate scores: one shows the presence/absence of symptoms, while the other relates to the degree of interference that these symptoms cause. The total score is obtained by adding these two scores together. This total score is generally considered to provide better predictability than either of the separate scores alone. A total score of 21 points or above is considered to show the presence of significant OCS. In our study, the LOI-CV was used to divide patients into two groups: OCS+ (total score of 21 or above) and OCS– (total score of 20 or below).

The Body Dysmorphic Disorder Questionnaire (BDDQ) is a 7-item self-report instrument that is used to screen for BDD. The items are all yes/no questions, and at-risk cases are considered to be those with a score of 4 or higher along with affirmative answers both for items 1 and 2 as well as for either item 3 or item 6, in addition to option 2 or 3 in item 7.[36,37]

Intelligence quotient (IQ) was assessed using the Spanish version of the Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV),[38] which evaluates IQ in children aged between 6 and 16 years, and with the Wechsler Intelligence Scale for Adults, Third Edition (WAIS-III),[39] when subjects were over the age of 16 years. The Wechsler scales provide a verbal comprehension index (VCI), a perceptual reasoning index (PRI), a working memory index (WMI), and a processing speed index (PSI). A measure of general intelligence (GI) was derived from the VCI and the PRI and has been used as a more valid measure of fluid intelligence than IQ.[40] The mean of each index is 100, with a standard deviation of 15.

Statistical Analysis

Descriptive statistics were used (means and standard deviations) to summarize the quantitative results, and these were compared using analysis of variance (ANOVA). Categorical variables were reported with percentages and compared using the χ^2 test. To compare continuous variables between two groups, *t* tests were performed. To ensure normal sample distributions, clinical variables were examined using the Kolmogorov-Smirnov test. The Levene test was also used with the same variables to assess the equality of variances. The different clinical variables were analyzed with a generalized linear model using age, sex, and socioeconomic status as covariables. Post hoc analysis was performed with the Bonferroni correction for multiple comparisons to avoid the presence of false positives. A *P* value less than or equal to .05 was the confidence interval used for all of the analyses, and all analyses were performed using the statistical package SPSS 18.0.

RESULTS

Sociodemographic and Clinical Variables and Family History

A total of 128 patients, 64 OCS+ and 64 OCS–, were included along with 98 HC. Figure 1 shows how the sample was distributed. Among the CHR-P OCS+ subjects, a total of 3 patients were diagnosed with OCD. No significant differences were found in terms of age or sex between the 3 groups. Differences in SES were observed between patients (both OCS+ and OCS–) compared to HC ($P < .001$). Because of this, SES was included only as a covariable in the generalized linear models (Table 1).

Table 2.

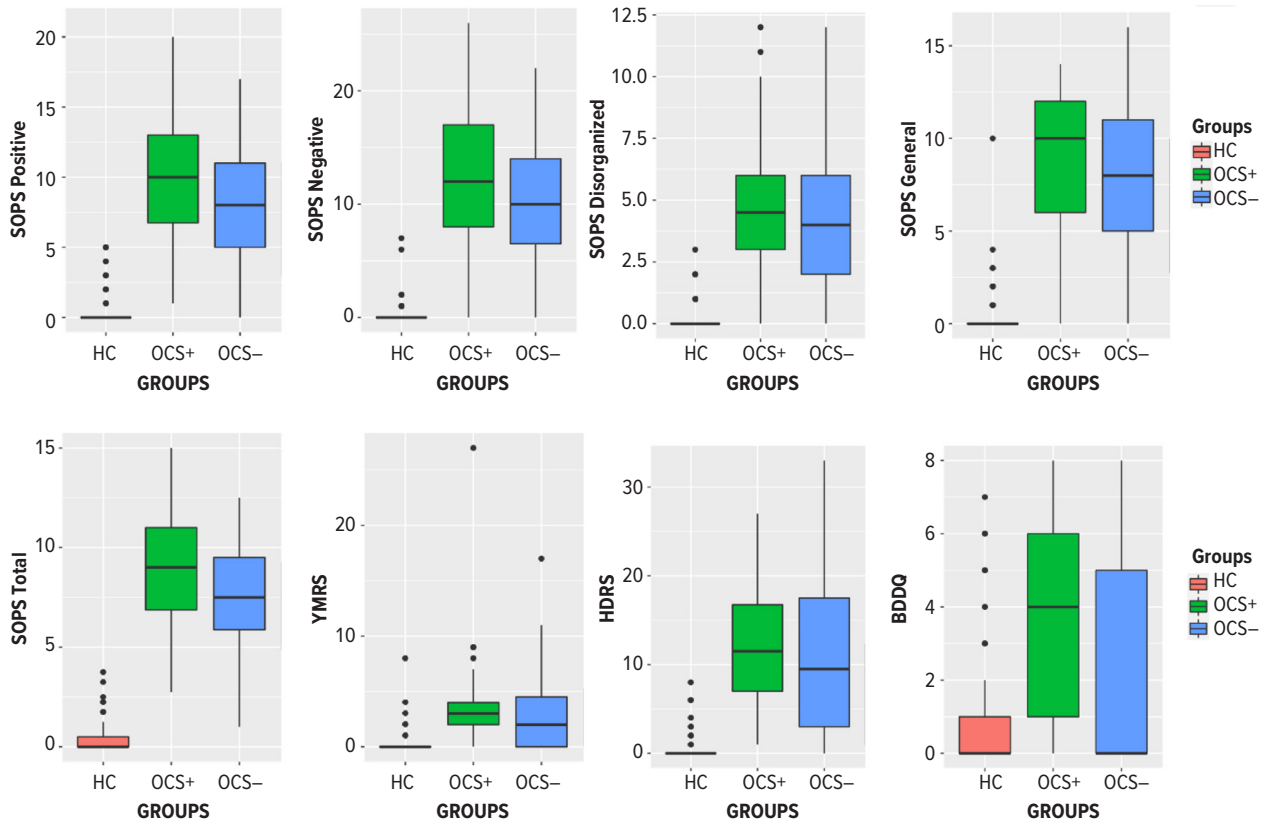
Clinical and Functional Characteristics of CHR-P Patients With Obsessive-Compulsive Symptoms, CHR-P Patients Without Obsessive-Compulsive Symptoms, and Healthy Controls

	OCS+ (n = 64), mean ± SD	OCS– (n = 64), mean ± SD	HC (n = 98), mean ± SD	*t*	*P*[a]	Between-Group Comparisons, *P*		
						OCS+ vs HC	OCS– vs HC	OCS+ vs OCS–
SOPS Positive	10 ± 4.7	8 ± 4.2	0.5 ± 1	268.056	**<.001**	**<.001***	**<.001***	**.004***
SOPS Negative	12.4 ± 5.5	10.1 ± 5.3	0.4 ± 1	293.333	**<.001**	**<.001***	**<.001***	**.047***
SOPS Disorganized	4.9 ± 2.8	4.2 ± 2.7	0.3 ± 0.7	178.699	**<.001**	**<.001***	**<.001***	.846
SOPS General	8.9 ± 3.6	7.6 ± 4	0.5 ± 1.3	341.946	**<.001**	**<.001***	**<.001***	**.039***
SOPS Total	35.8 ± 11.5	30.2 ± 11.6	1.6 ± 2.8	551.905	**<.001**	**<.001**	**<.001**	**.007***
BDDQ	3.9 ± 2.8	2 ± 2.9	0.9 ± 1.6	56.941	**<.001**	**<.001***	**.009***	**<.001***
HDRS	12.2 ± 6.6	10.3 ± 8.4	0.7 ± 1.6	142.717	**<.001**	**<.001***	**<.001***	.423
YMRS	3.5 ± 3.9	3.2 ± 3.5	0.4 ± 1.2	41.929	**<.001**	**<.001***	**<.001***	.749
GI	94.8 ± 18.5	100.6 ± 13.9	109.3 ± 12	11.822	**.003**	**.006***	**.025***	.634
Baseline GAF	48.3 ± 13	54.1 ± 1.5	86.5 ± 7.1	397.122	**<.001**	**<.001***	**<.001***	**.044***
Last Year GAF	71.5 ± 11.7	77.1 ± 9.4	88.7 ± 5.5	108.459	**<.001**	**<.001***	**<.001***	**.004***

[a]Bonferroni correction for multiple comparisons applied; boldface indicates statistical significance.
**P* value after the application of Bonferroni correction for multiple comparisons; boldface indicates statistical significance.
Abbreviations: BDDQ = Body Dysmorphic Disorder Questionnaire, CHR-P = clinical high risk for psychosis, GAF = Global Assessment of Functioning, GI = general intelligence, HC = healthy controls, HDRS = Hamilton Depression Rating Scale, LOI-CV = Leyton Obsessive Inventory–Child Version, OCS+ = CHR-P patients who scored positively on the LOI-CV, OCS– = CHR-P patients who scored negatively on the LOI-CV, SOPS = scale of prodromal symptoms, YMRS = Young Mania Rating Scale.

Figure 2.

Box Plots Comparing Clinical Variables and Functioning Between OCS+ Patients, OCS– Patients, and HC



Abbreviations: BDDQ = Body Dysmorphic Disorder Questionnaire, CHR-P = clinical high risk for psychosis, HC = healthy controls, HDRS = Hamilton Depression Rating Scale, LOI-CV = Leyton Obsessive Inventory–Child Version, OCS+ = CHR-P patients who scored positively on the LOI-CV, OCS– = CHR-P patients who scored negatively on the LOI-CV, SOPS = scale of prodromal symptoms, YMRS = Young Mania Rating Scale.

No differences were found between OCS+ and OCS– patients in terms of personal psychiatric background or family history. Patients had both a more extensive family background in general (OCS+ = 78.1% and OCS– = 84.4%) and relatives with a greater number of comorbid disorders (OCS+ mean ± SD = 0.9 ± 0.1 and OCS– mean ± SD = 1.0 ± 0.9) compared to HC. Regarding medication, OCS+ subjects were prescribed antidepressants significantly more often than the OCS– group (56.3% vs 29.7%, respectively; $P = .004$), but there was no difference between groups in the frequency of antipsychotic prescription (OCS+ = 45.3% and OCS– = 46.9%). Also, psychological treatment alone was received by both groups of patients at exactly the same rate (29.7%). No significant differences were found in hospitalization rates or cannabis use between OCS+ and OCS– patients.

Differences Between OCS+ Patients, OCS– Patients, and HC in Clinical and Functioning Scales

Significant differences were found in SOPS scale scores between the 3 groups (Table 2). The OCS+ group had the highest scores, followed by the OCS– group, which obtained significantly lower scores on the positive ($P = .004$) and negative ($P = .047$) subscales as well as higher general subscale ($P = .039$) and total ($P = .007$) scores (Figure 2). Results from the BDDQ also showed certain differences between the 3 groups. The OCS+ group had higher scores ($P < .001$) than did OCS– subjects and HC. Significant differences were found in functioning, both current ($P = .044$) and over the previous year ($P = .004$), with the OCS+ group showing the worst functioning, followed by the OCS– group and, lastly, HC.

Clinical and functional variables were examined to compare OCS+ patients with dysmorphophobia (OCS+BDDQ+) versus those without dysmorphophobia (OCS+BDDQ–), and we found that OCS+BDDQ+ patients had higher rates of depression and worse functionality (Supplementary Table 1). In our sample, the positive Pearson correlation was significant between BDDQ total scores and LOI-CV scores ($R = 0.428$, $P < .001$).

There were no significant differences when the 3 patients diagnosed with OCD were excluded from the analysis (Supplementary Table 2). As outlined in Supplementary Tables 3 and 4, we compared OCS+, OCS–, and HC without OCS and found no results different from those already presented in this study.

DISCUSSION

The current study explored differences in terms of clinical presentation, cognition, and functioning in patients with CHR-P plus OCS versus those with no OCS. To our knowledge, this study is the first to have focused on this issue with a sample composed entirely of children and adolescents. Our study found that 50% of the CHR-P subjects had OCS, and this group showed more prodromal and dysmorphophobic symptoms and worse functioning than the OCS– group.

This high percentage of OCS in subjects with CHR-P compared to HC is one of our main findings. Our sample included 128 CHR-P patients, and exactly half of them had OCS, which is considerably higher than what other studies have found in older subjects. Those studies have reported rates of OCS of 11%–35%.[18,19]

Regarding clinical symptomatology, all of the studies conducted with adult samples have reported similar findings to what we have found: more OCS is associated with higher levels of prodromal symptomatology.[17,18] Soyata et al,[19] looking at an adult sample, suggested that these symptoms are of longer duration.

Our study found no significant differences between OCS+ and OCS– groups regarding family background of psychotic illness. This result supports the findings of Soyata et al.[19] Some studies have proposed a common neurobiological mechanism that includes a dysregulation of serotonin and an alteration of the corticostriatal circuit and of the anterior cingulate cortex in psychotic disorders and OCD.[41–43]

Our study, looking at GAF results, found that the OCS+ group had worse functioning at baseline compared to the OCS– group, who, in turn, showed worse functioning than HC. This same pattern was observed regarding subjects' functioning over the previous year. Nevertheless, some studies with adults maintain that there are no differences between OCS+ subjects, OCS– subjects, and HC in terms of functioning.[17,18]

Regarding medication, more than 70% of our patients were taking psychopharmaceuticals at the time of their baseline visit. Among CHR-P patients, the most frequently prescribed medications were antipsychotics (17%–63%) and antidepressants (15%–50%).[21] This finding is significant since antipsychotics can cause secondary symptoms that are similar to OCD, which could blur findings.[18] However, it is worth noting that ongoing antipsychotic treatment in CHR-P could possibly mitigate the initial clinical presentation and modulate the later outcome trajectory.[44]

Regarding BDD, this study is the first to evaluate BDD symptoms in child and adolescent CHR-P patients with and without OCS. The main finding was that OCS+ patients had an increased number of dysmorphophobic symptoms, and these patients have higher rates of depression and poorer functioning. This finding supports the idea that, within the obsessive-compulsive spectrum, OCD and BDD may share common underlying mechanisms.[45] In our sample, we found a positive correlation between OCS and dysmorphophobia symptomatology. Some experts suggest that there is combined involvement of the serotonergic, dopaminergic, and glutamatergic systems in OCD and BDD.[46] A systematic review[47] shows the similarities between

BDD and OCD: age at onset, illness course, symptom severity, and level of functional impairment, along with high degree of perfectionism and fear of negative evaluation. Some differences were also found: BDD insight was clearly worse, and patients with BDD showed impaired facial affect recognition, increased social anxiety severity, and overall greater social-affective dysregulation.

Strengths and Limitations

The main strengths of this study include the fact that it includes a large and homogeneous sample of children and adolescents along with a control group matched for age and sex, thus making the results more generalizable. Additionally, the instruments used have all been validated in Spanish.

The study's limitations include the following: (1) Overall, 19.4% of HC had LOI-CV scores that showed OCS (19 of 98 subjects), which made the control group somewhat heterogeneous. That said, some studies have found OCS rates of up to 21%–25% in the general population,[48] which would put our findings well within the normal range. We compare the differences found between OCS+ patients and HC with OCS in Supplementary Tables 5 and 6. (2) The LOI-CV has been validated in the general population only with a sample of 8- to 12-year-old subjects and not in a clinical population. Our sample included subjects between the ages of 11 and 17 years, with the mean age being about 15 years. Nevertheless, this instrument has high reliability, with an intraclass correlation of 0.79–0.90,[35] and it is considered to be an effective tool for detecting OCS. For greater validity and reliability, a structured interview specific to OCD could be administered. (3) Our CHR-P criteria included attenuated negative symptoms. This approach follows that of Cornblatt et al,[4] although not all studies of high risk for psychosis have included these symptoms. (4) Lastly, the patients and HC were not matched for SES, although this was corrected for by using this factor only as a covariable in the statistical analysis.

In conclusion, patients with CHR-P who are OCS+ are a population that needs to be closely monitored, considering that they present high-level prodromal symptoms and worse functioning compared to OCS– subjects. Greater awareness of the risks these subjects face, along with more intensive and specific treatments, can help improve these subjects' functioning and quality of life. Systematic evaluation of OCS in subjects with CHR-P could help clinicians optimize pharmacologic and psychological interventions to improve these individuals' functioning and prognosis.

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Supplementary Material

Article Title: Obsessive-Compulsive Spectrum Symptoms Are Associated With Functional Impairment in Children and Adolescents With Psychosis Risk Syndrome: The CAPRIS Study

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DISCLAIMER

Supplementary Table 1: Clinical and functional characteristics of clinical high risk for psychosis patients with Obsessive-Compulsive Symptoms and dysmorphophobia symptoms (OCS+BDDQ+), and clinical high risk for psychosis patients with Obsessive-Compulsive Symptoms without dysmorphophobia symptoms (OCS+BDDQ-).

	OCS+BDDQ+ **N=40*** (Mean/SD)	**OCS+BDDQ-** **N=21*** (Mean/SD)	**t/χ^2**	**p**
SOPS Positive	10±4.6	9.6±4.6	-0.306	0.761
SOPS Negative	12.8±4.6	11.3±7	-1.004	0.319
SOPS Disorganized	4.9±2.6	5±3.3	0.195	0.846
SOPS General	9.4±3.6	7.8±3.5	-1.692	0.96
SOPS Total	36.7±9.5	33.1±14.2	-1.038	0.306
HDRS	13.8±7	10.2±5	-2.081	**0.042**
YMRS	3.3±2.5	3.9±5.8	0.440	0.664
GI	97±14	95.4±16.1	-0.365	0.718
Baseline GAF	45.7±12.1	55.3±11.2	3.003	**0.004**
Last Year GAF	72.8±11.1	69.2±13.4	-0.957	0.347

*N=61. Three missing because patients did not return the questionnaire. Boldface indicates statistical significance.

Abbreviations:

HC: healthy controls. HDRS: Hamilton Depression Rating Scale. GAF: Global Assessment of Functioning. GI: General Intelligence. OCS+BDDQ+: clinical high risk for psychosis patients who scored positively on the Leyton Obsessional Inventory-Child Version questionnaire and scored positively on the Body Dysmorphic Disorder Questionnaire. OCS+BDDQ-: clinical high risk for psychosis patients who scored positively on the Leyton Obsessional Inventory-Child Version questionnaire and scored negatively on the Body Dysmorphic Disorder Questionnaire. SOPS: scale of prodromal symptoms. YMRS: Young Mania Rating Scale.

Supplementary Table 2. Clinical and functional characteristics of clinical high risk for psychosis patients with Obsessive-Compulsive Symptoms without OCD (OCS+nonOCD), clinical high risk for psychosis patients without Obsessive-Compulsive Symptoms (OCS-) and healthy controls (HC).

	OCS+nonOCD N=61 (Mean/SD)	**OCS- N=64** (Mean/SD)	**HC N=98** (Mean/SD)	**t/χ^2**	**P[a]**	**Between-group comparisons**		
						OCS+nonOCD vs HC	**OCS- vs HC**	**OCS+nonOCD vs OCS-**
SOPS Positive	9,85±4.6	8±4.2	0.5±1	268.056	**<0.001**	**<0.001***	**<0.001***	**0.009***
SOPS Negative	12.4±5.3	10.1±5.3	0.4±1	293.333	**<0.001**	**<0.001***	**<0.001***	**0.033***
SOPS Disorganized	4.7±2.6	4.2±2.7	0.3±0.7	178.699	**<0.001**	**<0.001**	**<0.001**	0.522
SOPS General	8.83±3.7	7.6±4	0.5±1.3	341.946	**<0.001**	**<0.001**	**<0.001**	**0.020**
SOPS Total	35.4±11.3	30.2±11.6	1.6±2.8	551.905	**<0.001**	**<0.001***	**<0.001***	**<0.013***
BDDQ	3.7±2.8	2±2.9	0.9±1.6	56.941	**<0.001**	**<0.001**	**0.013***	**<0.001**
HDRS	12.2±6.7	10.3±8.4	0.7±1.6	142.717	**<0.001**	**<0.001**	**<0.001**	0.141
YMRS	3.4±3.9	3.2±3.5	0.4±1.2	41.929	**<0.001**	**<0.001**	**<0.001**	0.975
GI	94.1±18.7	100.6±13.9	109.3±12	11.822	**<0.001**	**0.007***	**0.026***	0.619
Baseline GAF	48.2±13.2	54.1±1.5	86.5±7.1	397.122	**<0.001**	**<0.001***	**<0.001***	**0.045***
LastYear GAF	72±11.5	77.1±9.4	88.7±5.5	108.459	**<0.001**	**<0.001***	**<0.001***	**0.012***

[a]Bonferroni correction for multiple comparisons applied. *p-value after the application of Bonferroni correction for multiple comparisons. Boldface indicates statistical significance.

Abbreviations:

BDDQ: Body Dysmorphic Disorder Questionnaire. HC: healthy controls. HDRS: Hamilton Depression Rating Scale. GAF: Global Assessment of Functioning. GI: General Intelligence. OCS-: clinical high risk for psychosis patients who scored negatively on the LOI-CV questionnaire. OCS+nonOCD: clinical high risk for psychosis patients who scored positively on the LOI-CV questionnaire but do not have OCD. SOPS: scale of prodromal symptoms. YMRS: Young Mania Rating Scale.

Supplementary Table 3. Demographic and clinical characteristics of clinical high risk for psychosis (CHR-P) patients with Obsessive-Compulsive Symptoms, clinical high risk for psychosis (CHR-P) patients without Obsessive-Compulsive Symptoms, and healthy controls without Obsessive-Compulsive Symptoms (HC-).

	OCS+ N=64	**OCS- N=64**	**HC- N=79**	**t/χ^2**	**P[a]**	**Between-group comparisons**		
						OCS+ vs HC	**OCS- vs HC**	**OCS+ vs OCS-**
Age (Mean±SD)	15.4±1.4	15.1±1.9	15.4±1.6	1.149	0.319			
Gender: Male (N, %)	22 34.4%	22 34.4%	33 41.8%	1.144	0.564			
SES[b] (Mean±SD)	34.8±16	38.2±19.2	51.7±13.4	20.519	**<0.001[c]**			
Pharmacological treatment at baseline (N, %)	46 71.9%	43 67.2%	0 0%	100.791	**<0.001**	**<0.001***	**<0.001***	0.588
Antipsychotics (N, %)	29 45.3%	30 46.9%	0 0%	52.506	**<0.001**	**<0.001***	**<0.001***	0.858
Antidepressants (N, %)	36 56.3%	19 29.7%	0 0%	58.031	**<0.004**	**<0.001***	**<0.001***	**0.004***
Psychiatric history (N, %)	55 85.9%	54 84.4%	19 24.1%	88.423	**<0.001**	**<0.001***	**<0.001***	0.939
Relatives' psychiatric history (N, %)	50 78.1%	54 84.4%	23 29.1%	60.604	**<0.001**	**<0.001***	**<0.001***	0.520
Relatives with psychotic disorder (N, %)	32 50%	43 67.2%	0 0%	72.533	**<0.001**	**<0.001***	**<0.001***	0.057

[a]Bonferroni correction for multiple comparisons applied. *p-value after the application of Bonferroni correction for multiple comparisons. Boldface indicates statistical significance.

[b]SES was measured using the Hollingshead and Redlich scale, which has 5 possible scores, from I (1) to V (5), with lower numbers indicating higher SES.

[c]OCS+=OCS- <HC

Abbreviations: HC-: healthy controls without OCS. OCS+: clinical high risk for psychosis patients who scored positively on the Leyton Obsessional Inventory-Child Version questionnaire. OCS-: clinical high risk for psychosis patients who scored negatively on the Leyton Obsessional Inventory-Child Version questionnaire. SES: socio-economic status.

Supplementary Table 4. Clinical and functional characteristics of clinical high risk for psychosis patients with Obsessive-Compulsive Symptoms (OCS+), clinical high risk for psychosis patients without Obsessive-Compulsive Symptoms (OCS-) and healthy controls without Obsessive-Compulsive Symptoms (HC-).

	OCS + **N=64** (Mean/SD)	**OCS -** **N=64** (Mean/SD)	**HC-** **N=79** (Mean/SD)	**t/χ^2**	**P[a]**	**Between-group comparisons**		
						OCS+ vs HC	**OCS- vs HC**	**OCS+ vs OCS-**
SOPS Positive	10±4.7	8±4.2	0.3±0.8	145.879	**<0.001**	**<0.001***	**<0.001***	**0.005***
SOPS Negative	12.4±5.5	10.1±5.3	0.2±0.5	160.768	**<0.001**	**<0.001***	**<0.001***	**0.018**
SOPS Disorganized	4.9±2.8	4.2±2.7	0.3±0.6	89.131	**<0.001**	**<0.001***	**<0.001***	0.309
SOPS General	8.9±3.6	7.6±4	0.5±1.3	149.150	**<0.001**	**<0.001**	**<0.001***	**0.041***
SOPS Total	35.8±11.5	30.2±11.6	1.2±2	286.291	**<0.001**	**<0.001**	**<0.001**	**0.008***
BDDQ	3.9±2.8	2±2.9	0.8±1.6	26.997	**<0.001**	**<0.001***	**0.003***	**<0.001***
HDRS	12.2±6.6	10.3±8.4	0.5±1.1	74.622	**<0.001**	**<0.001***	**<0.001***	0.161
YMRS	3.5±3.9	3.2±3.5	0.3±0.8	23.786	**<0.001**	**<0.001***	**<0.001***	0.758
GI	94.8±18.5	100.6±13.9	109.9±11.8	18.829	**<0.001**	**0.010***	**0.030***	0.674
Baseline GAF	48.3±13	54.1±1.5	87.3±6.4	210.143	**<0.001**	**<0.001***	**<0.001***	**0.043***
LastYear GAF	71.5±11.7	77.1±9.4	89.3±	65.935	**<0.001**	**<0.001***	**<0.001***	**0.005***

[a]Bonferroni correction for multiple comparisons applied. *p-value after the application of Bonferroni correction for multiple comparisons. Boldface indicates statistical significance.

Abbreviations: BDDQ: Body Dysmorphic Disorder Questionnaire. GAF: Global Assessment of Functioning. GI: General Intelligence. HC-: healthy controls without Obsessive Compulsive Symptoms. HDRS: Hamilton Depression Rating Scale. OCS+: clinical high risk for psychosis patients who scored positively on the Leyton Obsessional Inventory-Child Version questionnaire. OCS-: clinical high risk for psychosis patients who scored negatively on the Leyton Obsessional Inventory-Child Version questionnaire. SOPS: scale of prodromal symptoms. YMRS: Young Mania Rating Scale.

Supplementary Table 5. Demographic and clinical characteristics of clinical high risk for psychosis patients with Obsessive-Compulsive Symptoms (OCS+) and healthy controls with Obsessive-Compulsive Symptoms (HC+)

	OCS+ **N=64**	**HC+** **N=19**	**t/χ^2**	**P[a]**
Age (Mean±SD)	15.5±1.4	15.6±1.1	-0.501	0.617
Gender: Male (N, %)	22 34.4%	9 47.4%	1.057	0.304
SES[b] (Mean±SD)	34.8±16	44.7±20.6	-1.860	0.075
Psychiatric history (N, %)	55 86%	3 15.8%	40.195	**<0.001**
Relatives' psychiatric history (N, %)	50 78.1%	4 21.1%	23.241	**<0.001**

[a]Boldface indicates statistical significance.

[b]SES was measured using the Hollingshead and Redlich scale, which has 5 possible scores, from I (1) to V (5), with lower numbers indicating higher SES.

Abbreviations: HC+: Healthy controls with Obsessive-compulsive Symptoms. OCS+: clinical high risk for psychosis patients who scored positively on the Leyton Obsessional Inventory-Child Version questionnaire. SES: socio-economic status.

Supplementary Table 6. Clinical and functional characteristics of clinical high risk for psychosis patients with Obsessive-Compulsive Symptoms (OCS+) and healthy controls with Obsessive-Compulsive Symptoms (HC+)

	OCS+ **N=64** (Mean/SD)	**HC+** **N=19** (Mean/SD)	**t/χ^2**	**p[a]**
SOPS Positive	10±4.7	1.1±1.7	12.761	**<0.001**
SOPS Negative	12.4±5.5	1±2.1	13.701	**<0.001**
SOPS Disorganized	4.9±2.8	0.3±0.7	11.953	**<0.001**
SOPS General	8.9±3.6	0.6±1.2	15.502	**<0.001**
SOPS Total	35.8±11.5	3±4.7	18.202	**<0.001**
BDDQ	3.9±2.8	1.4±1.7	4.658	**<0.001**
HDRS	12.2±6.6	1.5±2.5	10.184	**<0.001**
YMRS	3.5±3.9	0.6±1.9	3.033	**0.003**
GI	94.8±18.5	106.3±12.6	-2.407	0.019
Baseline GAF	48.3±13	83.1±8.6	-10.895	**<0.001**
Last Year GAF	71.5±11.7	86±6.9	-5.940	**<0.001**

[a]Boldface indicates statistical significance.

Abbreviations: BDDQ: Body Dysmorphic Disorder Questionnaire. GAF: Global Assessment of Functioning. GI: General Intelligence. HC+: healthy controls with Obsessive-Compulsive Symptoms. HDRS: Hamilton Depression Rating Scale. OCS+: clinical high risk for psychosis patients who scored positively on the Leyton Obsessional Inventory-Child Version questionnaire. SOPS: scale of prodromal symptoms. YMRS: Young Mania Rating Scale.