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Obsessive-compulsive symptoms in individuals at clinical high risk for psychosis: A 2-year longitudinal study

Di Lisi Alessandro [a], Emanuela Leuci [b], Emanuela Quattrone [b], Silvia Azzali [c], Giuseppina Paulillo [b], Simona Pupo [d], Pietro Pellegrini [b], Menchetti Marco [a], Pelizza Lorenzo [a,b,*]

[a] Department of Biomedical and Neuromotor Sciences, Alma Mater Studiorum Università di Bologna, Viale Pepoli 5, 40126 Bologna, Italy
[b] Department of Mental Health and Pathological Addictions, AUSL di Parma, Largo Palli n. 1/a, 43100 Parma, Italy
[c] Department of Mental Health and Pathological Addictions, AUSL-IRCCS di Reggio Emilia, Via Amendola n. 2, 42100 Reggio Emilia, Italy
[d] Pain Therapy Service, Department of Medicine and Surgery, Azienda Ospedaliero-Universitaria di di Parma, Via Gramsci 14, 43100 Parma, Italy

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ABSTRACT

Aim - Recent findings suggest that OCS are prevalent in individuals with early psychosis. However, their clinical relevance still needs to be clarified. This research specifically explored OCS in subjects at Clinical High Risk for Psychosis (CHR—P), with the aims of determining their baseline prevalence, examining their 2-year stability, and analyzing their association with sociodemographic data, clinical characteristics and outcomes. Methods - Clinical assessments at baseline and during the 2-year follow-up period included: the Comprehensive Assessment of At-Risk Mental states (CAARMS), the Positive And Negative Syndrome Scale (PANSS), and the Global Assessment of Functioning (GAF). OCS were identified using the CAARMS item 7.6 subscore. Results - Among 180 CHR-P participants, 66 (36.7 %) had OCS at baseline. CHR-P with OCS had higher PANSS scores and greater antidepressant prescription rates. OCS severity levels improved in the first year, but plateaued over two years, correlating with longitudinal changes in GAF and PANSS total scores. OCS improvement was specifically associated with antidepressant use and intensity of individual psychotherapy sessions. CHR-P subjects with OCS had higher service engagement rates. Conclusions - The presence of OCS could characterize a distinct CHR-P subtype with specific clinical and prognostic characteristics, requiring tailored diagnostic and therapeutic approaches. Recognizing the heterogeneity in CHR-P population is crucial for optimizing care.

1. Introduction

The connection between Obsessive-Compulsive Symptoms/Disorder (OCS/OCD) and psychosis, particularly in schizophrenia spectrum disorders, has been recognized for over a century (Bürgy, 2005). In 1877, Westphal described this connection (Janet and Raymond, 1903). Recent research shows that around 12 % of those with schizophrenia spectrum disorders have OCD, and over 30 % experience OCS (Swets et al., 2014). Some researchers have proposed a "Schizo-Obsessive" subtype of schizophrenia (Bottas et al., 2005) and others have suggested that second-generation antipsychotics, like clozapine, may contribute to the high prevalence of OCS in schizophrenic patients (Fonseka et al., 2014). Despite years of study, the precise psychopathological relationship between obsessions and psychotic symptoms, especially delusions, remains unclear. In order to better understand this intricate bond, in our opinion it is essential to investigate the prevalence of OCS/OCD (and thus their clinical significance) in prodromal phase of psychosis and in individuals with at-risk mental states (Pelizza and Pupo, 2013). In this respect, as early as 1919, Kraepelin wrote: "...it is possible that there is a transition of obsession into other mental affections, especially paranoia". In this sense, the presence of OCS has been historically regarded as a prodromal sign of psychosis (Hur et al., 2012).

Phenomenological research showed how schizophrenia spectrum disorders are characterized by fundamental disturbances in the basic sense of self. (Henriksen and Nordgaard, 2014). OCS could be considered as part of a broader spectrum of self-disorders indicative of psychosis prodromes. The Examination of Anomalous Self-Experience (EASE) framework categorizes obsessions as abnormalities of cognition and stream of consciousness (Parnas et al., 2005). It underscores the distinction, as previously defined by Jaspers (1913), between true obsessions (which are ego-dystonic with persistent internal resistance and content that is not horrid or macabre) and the type of obsessions

* Corresponding author at: Istituto di Psichiatria "Ottonello", Viale Pepoli n.5, 40126 Bologna (BO), Italy.
E-mail address: lorenzo.pelizza@unibo.it (P. Lorenzo).

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typically seen in the schizophrenia spectrum (which are ego-syntonic, lacking the characteristic resistance).

More recently, it has been reported that more than one in ten adults with OCD showed positive psychotic features during their illness course (Fontenelle et al., 2008; Okamura et al., 2022). This OCD subgroup was specifically characterized by earlier OCD onset, poorer insight on OCS, more frequently chronic course, higher prevalence of schizotypal personality traits and specific patterns of basic symptoms (i.e, cognitive and perceptive disturbances) (Pelizza and Pupo, 2015). Additionally, also a significant portion (44 %) of adolescent with OCD experienced subjective symptoms of psychotic vulnerability (i.e., cognitive and perceptive basic symptoms), which resulted to be associated with greater OCD severity, poorer insight, and worse psychosocial functioning (Pelizza et al., 2021; Borrelli et al., 2023). A crucial question still remains unanswered: i.e., whether this clinical entity should be considered as a special psychopathological condition belonging to schizophrenia spectrum disorders (and at higher risk of developing schizophrenia) or as an OCD subgroup placed on the most clinically severe extreme of obsessive-compulsive spectrum. In this respect, Poletti et al. (2023) hypothesized that OCD and schizophrenia spectrum disorders may be described along a neurodevelopmental/phenomenological continuum characterized by a dimensional gradient of sensorimotor deviances, with schizotypy representing a dimensional bridge between these two categorically distinct disorders. Additionally, the broad criteria for OCD in DSM-5, which allow for a diagnosis even when insight is absent could also lead to confusion and misdiagnosis. Patients with schizophrenia may be mistakenly diagnosed with OCD if their obsessive-like symptoms are not carefully evaluated within the context of their overall psychopathology. (Rasmussen and Parnas, 2022).

Within the CHR-P model (McGorry and Mei, 2018), the prevalence of OCS varies (11–60 %) due to different criteria for CHR-P mental states and OCS (Soyata et al., 2018; Martinho et al., 2023). CHR-P individuals with OCS tend to exhibit more severe clinical symptoms and poorer global functioning compared to those without OCS (Hur et al., 2012; Zink et al., 2013; Fusar-Poli et al., 2014; Averna et al., 2018) (see Supplementary Materials [Table S1] for details). Fontenelle et al. (2011) found that de novo OCD in CHR-P individuals was linked to the development of mood disorders with psychotic features. CHR-P individuals with OCS also performed better in neuro-cognitive tests, especially in attention, visual working memory, and verbal memory, compared to those without OCS (Hur et al., 2012; Zink et al., 2013; Soyata et al., 2018).

The variability in OCS/OCD prevalence among studies further supports the fact that the CHR-P population is probably too heterogeneous (Ryan et al., 2018). In this sense, CHR-P subjects with OCS/OCD could represent a distinct subtype with different clinical, functional and neurobiological characteristics, and consequently with different clinical, diagnostic and therapeutic options and implications.

Starting from this background, the aims of this investigation were: (a) to calculate the prevalence of OCS/OCD in an Italian CHR-P sample treated within a specialized "Early Intervention in Psychosis" (EIP) program, (b) to compare socio-demographic and clinical characteristics at baseline between CHR-P individuals with and without OCS; (c) to examine the longitudinal stability of OCS in the total CHR-P population across a 2-year follow-up period; (d) to analyze any relevant association of OCS with sociodemographic data, clinical features, and specific treatment components provided in our EIP program over time; and (e) to compare specific 2-year outcome parameters between the two CHR-P subgroups.

2. Material and methods

2.1. Setting and participants

All CHR-P participants were sequentially enrolled within the "Parma At-Risk Mental States" (PARMS) program from January 2016 to December 2021. The PARMS program is a specialized EIP infrastructure diffusely implemented across all adolescent and adult mental healthcare services in the Parma Department of Mental Health (Northern Italy) (Pelizza et al., 2023a).

Inclusion criteria were: (a) to seek specialized mental health assistance; (b) age 12–25 years, (c) to meet CHR-P criteria as defined by the "Comprehensive Assessment of At-Risk Mental States" (CAARMS) (Yung et al., 2005) at the baseline assessment (i.e, Attenuated Psychotic Symptoms [APS], Brief Limited Intermittent Psychotic Symptoms [BLIPS], and "Genetic Vulnerability").

Exclusion criteria were: (a) past overt affective or non-affective psychotic episodes; (b) previous exposure to AP drug or current AP intake for a duration exceeding 4 weeks in the present illness episode, (c) known intellectual disability (IQ < 70); (d) neurological or other medical disorder with psychiatric manifestations. Past use of AP medication was considered a proxy for past psychotic episode, consistently with the original CAARMS criteria for psychosis threshold (Yung et al., 2005). A current AP prescription of <4 weeks was required to minimize pharmacological interference with baseline psychopathological assessment (Pelizza et al., 2023b).

All participants and parents (if minors) provided written informed consent for their participation in the study. This research obtained approval from the local ethics committee (AVEN Ethics Committee protocol n. 559/2020/OSS*/AUSLPR) and adhered to the principles outlined in the 1964 Declaration of Helsinki and its later amendments. The data supporting the findings of this investigation are not publicly available due to privacy/ethical restrictions, but may be shared with the corresponding author upon reasonable request.

2.2. Instruments

The psychopathological evaluation encompassed the CAARMS, the "Health of the Nation Outcome Scale" (HoNOS) (Wing et al., 1998), the "Positive And Negative Syndrome Scale" (PANSS) (Kay et al., 1987), and the "Global Assessment of Functioning" (GAF) scale (APA, 2016).

The CAARMS is a clinical interview designed to explore multiple aspects of attenuated psychopathology. Its "Positive Symptoms" subscale serves as the basis for defining both CHR-P and psychosis criteria. CAARMS interviews were conducted by trained PARMS team members using the approved Italian version (CAARMS-ITA) (Raballo et al., 2013). Regular CAARMS scoring workshops and supervision sessions were implemented to ensure good values of interrater reliability (Pelizza et al., 2019a). In this investigation, the presence of OCS was detected using the CAARMS item 7.6 ("OCS") subscore (e.g., "Have you disturbing or intrusive thoughts going around in your head and not can you stop?", "Are there repetitive behaviors that you feel forced to do?", "Do you repeatedly check things (such as the switches on electricity/gas, if electrical appliances are switched off, or doors are locked)?"). A cut-off score of ≥ 2 on this item indicates at least mild OCS, while a cut-off score of ≥ 4 indicates OCS interfering with daily socio-occupational functioning. Every 12 months in the follow-up, CAARMS interview was re-administered to psychometrically identify psychosis transition and CHR-P criteria persistence, as well as to longitudinally assess OCS severity levels.

The HoNOS assesses mental health and social functioning in individuals with severe mental illness, including early psychosis (Lora et al., 2001; Leuci et al., 2022). It's divided into four main domains: "Behavioral Problems," "Impairment," "Psychiatric Symptoms," and "Social Problems" (Wing et al., 1999) A score of ≤ 2 on HoNOS items 9, 10, and 11 within the "Social Problems" domain indicates functional remission (Kortrijk et al., 2012).

The PANSS is a widely used interview for assessing psychopathology in psychosis, also in young individuals at illness onset (Pelizza et al., 2020a; Poletti et al., 2022a). As proposed by Shafer and Dazzi (2019), we considered five key psychopathological dimensions: "Disorganization," "Negative Symptoms," "Positive Symptoms," "Resistance/

Excitement," and "Affect" ("Depression-Anxiety"). Symptomatic remission is indicated by a score of ≤3 on the 8 PANSS items specified by the "Remission in Schizophrenia Working Group's criteria" (Andreasen et al., 2005). We also assessed the presence and course of persistent negative symptoms based on the PANSS using stringent clinical criteria (Buchanan, 2007) (see Supplementary Materials [Table S2] for details).

The GAF is a commonly used scale for evaluating clinical status and socio-occupational functioning in individuals with severe mental disorders, including early psychosis (Poletti et al., 2021). According to Zhang et al. (2022), we considered a current GAF score of >60 at follow-ups as an index of functional remission.

Lastly, we completed a sociodemographic and clinical chart, including information on "Duration of Untreated Illness" (DUI), new suicide attempt and self-harm, current suicidal ideation, functional recovery, and service disengagement (for details on their operative definitions, see Supplementary Materials [Table S2]) (Silva and Restrepo, 2019). All assessment instruments were administered both at baseline (T0) and every 12 months during the 2-year follow-up period (i.e., at 1- and 2-year assessment time [T1 and T2]).

2.3. Procedures

The initial DSM-5 diagnosis was established through assessments conducted by a minimum of two trained PARMS team members, using the Structured Clinical Interview for DSM-5 disorders (SCID-5) (First et al., 2016). Following CAARMS interviews, CHR-P individuals with OCS (i.e., with a CAARMS item 7.6 subscore of ≥2) were categorized as CHR-P/OCS+ subgroup. CHR-P participants without OCS at presentation were included in the CHR-P/OCS- subgroup.

Within 3–4 weeks from baseline assessment, CHR-P participants were assigned to a multi-disciplinary team including a clinical psychologist, an early rehabilitation case manager, and a psychiatrist. In accordance with current official guidelines on EIP (Schmidt et al., 2015; Schultze-Lutter et al., 2015; RER, 2023), AP medication use at entry should be reserved to CHR-P individuals who (a) displayed rapid deterioration in daily functioning, (b) experienced a sudden escalation of full-blown psychotic symptoms, (c) had an immediate risk of suicide or severe violence, or (d) failed to respond to psychosocial interventions (Fusar-Poli et al., 2019). As a first-line psychopharmacological treatment, low-dose atypical AP drugs were administered (Poletti et al., 2020).

Individual psychotherapy, family psychoeducation, and case management were provided to CHR-P individuals following specific models (van der Gaag et al., 2012; McFarlane et al., 2012). This included at least 15 sessions of individual psychotherapy (Azzali et al., 2022), 10–12 sessions of family psychoeducation (Pelizza et al., 2019b), and 24 sessions of early rehabilitation coordinated by a dedicated case manager over 2 years (Pelizza et al., 2020b; Ficarelli et al., 2021).

Data on medication, psychosocial intervention, psychopathology, functioning, and outcomes were collected at baseline and throughout the 2-year follow-up. The study initially compared sociodemographic, clinical, and treatment parameters between groups at baseline. It also examined the stability of OCS over the 2-year period and explored how changes in OCS severity related to psychopathological parameters and treatment response. Finally, it analyzed between-group differences in specific outcome measures.

2.4. Statistical analysis

The data analysis was conducted using the Statistical Package for Social Science (SPSS) version 15.0 for Windows (SPSS Inc., 2010). All tests were two-tailed with p value significance set at 0.05. In between-group comparisons, categorical variables were analyzed using the Chi-square (X2) test, while continuous variables using Mann-Whitney U test. Spearman's rank correlation coefficients were performed to examine significant associations of CAARMS item 7.6 (OCS) subscores with sociodemographic and clinical parameters both at baseline and during the 2-year follow-up period (T2). The Wilcoxon test for repeated measures was also carried out to assess the longitudinal stability of CAARMS OCS scores in the CHR-P total sample across the 2 years of follow-up. Furthermore, multiple linear regression analyses with CAARMS OCS subscores as dependent variables and intensity of specialized PARMS intervention components as independent variables were performed. In our longitudinal examinations, we used the differences (deltas [Δ]) between T0 and T1 or T2 CAARMS or PANSS scores as primary psychopathological parameters to examine overtime. Indeed, according to Ver Hoef (2012), the delta scores better describe longitudinal changes and temporal dynamics of psychosis psychopathology compared to T0, T1 and T2 single scores.

As for time-to-event outcome data (i.e., psychosis transition, new hospitalization, new suicide attempt, new self-harm, and service disengagement), after having previously checked that the proportionality-of-hazards assumption was met, univariate models were fitted for each outcome parameters across the 2 years of follow-up using Cox regression analysis (Sedgwick, 2013). For not time-to-event dependent variables (i.e., CHR-P criteria persistence, current suicidal ideation, functional recovery, GAF or HoNOS functional remission, PANSS symptomatic remission, and persistent negative symptoms), binary logistic regression analyses with OCS subgroup as independent variables were also performed (Harris, 2021).

3. Results

Among our 180 CHR-P participants, 66 (36.7 %) showed OCS at baseline and were classified into the CHR-P/OCS+ subgroup. Notably, 45 (25 %) of them experienced OCS interfering with daily socio-occupational functioning. The remaining 114 (66.3 %) participants were placed in the CHR-P/OCS- subgroup (see also Supplementary Materials [Table S3] for details on the distribution of OCS scores). The DSM-5 OCD diagnosis was observed in 8 CHR-P individuals (12.2 % of the CHR-P/OCS+ subsample and 4.4 % of the total CHR-P population) (see Supplementary Materials [Fig. S1] for details). Other DSM-5 diagnoses included depressive disorder (n = 20; 30.3 % of the CHR-P/OCS+ subgroup), psychotic disorder NOS (n = 10; 15.2 %), brief psychotic disorder (n = 8; 12.2 %), anxiety disorder (n = 7; 10.6 %), borderline personality disorder (n = 6; 9.1 %), and schizotypal personality disorder (n = 5; 7.6 %).

3.1. Baseline data

In comparison with CHR-P/OCS-, the CHR-P/OC+ subgroup had a higher PANSS total score, as well as higher PANSS "Positive Symptoms" and "Affect" factor subscores (Table 1). The CHR-P/OCS+ subsample showed a higher HoNOS total score, as well as a higher HoNOS "Psychiatric Symptoms" domain subscore.

Moreover, compared to CHR-P/OCS-, CHR-P/OCS+ participants had a higher antidepressant medication prescription rate (with higher mean equivalent dose of fluoxetine), and were more actively engaged in family psychoeducation.

Finally, Spearman's coefficients showed positive correlations of OCS severity levels with PANSS total score, PANSS "Disorganization" and "Affect" factor subscores, as well as with HoNOS "Psychiatric Symptoms" domain subscore (Table 2).

3.2. Longitudinal analysis

Along our 2-year follow-up period, we observed a statistically significant longitudinal decrease in OCS severity levels in the CHR-P total sample (Table 3). Specifically, despite a notable decrease in CAARMS item 7.6 subscore from T0 to T1), there was no further improvement in OCS between T1 and T2.

Moreover, longitudinal changes in T0-T2 OCS severity levels showed

Table 1
Baseline sociodemographic and clinical comparisons between the two CHR-P subgroups.

Variable	CHR-P/ OCS+ ($n = 66$)	CHR-P/ OCS- ($n = 114$)	X2/z	p
Gender (males)	38 (57.6 %)	52 (45.6 %)	2.392	0.122
Ethnic group (white Caucasian)	61 (92.4 %)	98 (86.0 %)	1.629	0.193
Migrant Status	6 (9.1 %)	22 (19.3 %)	3.315	0.099
Civil status (single)	63 (95.4 %)	112 (98.2 %)	1.446	0.229
Living status (with parents)	62 (93.9 %)	105 (92.1 %)	2.024	0.259
NEET	16 (24.2 %)	38 (33.3 %)	2.674	0.147
Age (at entry)	19.55 ± 3.78	19.52 ± 3.82	−0.003	0.998
Education (in years)	11.12 ± 2.55	11.44 ± 2.38	−0.942	0.346
DUI (in weeks)	49.67 ± 49.35	44.47 ± 48.59	−0.944	0.345
Past hospitalization	10 (15.2 %)	18 (15.8 %)	0.013	0.909
Past specialist contact	28 (42.4 %)	55 (48.2 %)	0.570	0.450
Past attempted suicide	7 (10.6 %)	12 (10.5 %)	0.001	0.987
Family history of psychosis	24 (36.4 %)	35 (30.7 %)	0.608	0.435
Current substance abuse	10 (15.2 %)	21 (18.4 %)	0.313	0.576
CHR-P subgroups				
APS	49 (74.2 %)	91 (79.8 %)	0.754	0.385
BLIPS	14 (21.2 %)	16 (14.0 %)	1.550	0.213
Genetic vulnerability	3 (4.6 %)	7 (6.2 %)	0.590	0.443
PANSS score				
Positive symptoms	14.83 ± 7.73	11.14 ± 5.25	−2.979	0.003
Negative symptoms	20.22 ± 6.67	18.84 ± 8.10	−1.123	0.261
Disorganization	16.62 ± 5.23	15.16 ± 5.37	−1.632	0.103
Affect	18.36 ± 4.67	13.85 ± 4.79	−4.448	0.0001
Resistance/excitement-activity	7.20 ± 3.19	7.28 ± 3.24	−0.159	0.874
Total score	76.00 ± 15.53	67.95 ± 17.74	−2.432	0.015
PANSS "Lack of judgment and insight" item 12	2.10 ± 1.18	2.32 ± 1.51	−0.521	0.602
GAF score	47.50 ± 7.16	49.44 ± 9.30	−1.614	0.107
HoNOS score				
Behavioral problems	2.73 ± 1.90	2.64 ± 2.19	−0.709	0.478
Impairment	2.45 ± 2.32	2.04 ± 1.62	−0.555	0.579
Psychiatric symptoms	10.15 ± 2.85	7.93 ± 3.18	−4.217	0.0001
Social problems	6.86 ± 4.33	5.80 ± 3.30	−1.078	0.281
Total score	22.20 ± 8.85	18.40 ± 7.00	−2.416	0.016
Antipsychotic medication prescription	34 (51.5 %)	58 (50.9 %)	0.007	0.934
Equivalent dose of chlorpromazine (mg/day)	72.60 ± 99.98	86.78 ± 122.76	−0.326	0.813
Antidepressant medication prescription	21 (31.8 %)	22 (19.3 %)	3.604	0.048
Equivalent dose of fluoxetine (mg/day)	40.89 ± 78.78	19.03 ± 45.48	−2.074	0.038
Individual psychotherapy	40 (60.6 %)	61 (53.5 %)	0.998	0.318
Family psychoeducation	30 (45.4 %)	35 (30.7 %)	3.810	0.049
Case management	42 (63.6 %)	61 (53.5 %)	1.973	0.160

Note. CHR-P = Clinical High Risk for Psychosis; OCS = Obsessive-compulsive symptoms; CHR-P/OCS+ = CHR-P individuals with OCS at baseline; CHR-P/OCS- = CHR-P individuals without OCS at baseline; NEET = Not in Education, Employment, or Training; DUI = Duration of Untreated Illness; APS = Attenuated Psychotic Symptoms, BLIPS = Brief Limited Intermittent Psychotic Symptoms; GRFD = Genetic Risk Functioning Deterioration syndrome; NOS = Not Otherwise Specified; PANSS = Positive And Negative Syndrome Scale; GAF = Global Assessment of Functioning; HoNOS = Health of the Nation Outcome Scale; p = statistical significance. Frequencies (and percentages), means ± standard deviation, Chi-squared test (X2) and Mann-Whitney *U* test (z) values are reported. Bonferroni's corrected *p* values are reported. Statistical significant *p* values are in bold.

Table 2
Baseline associations between OCS and sociodemographic/clinical parameters at baseline in the CHR-P total sample ($n = 180$).

Variable	CAARMS item 7.6 score (OCS) (ρ/z)	p
Gender	−0.279	0.781
Ethnic group (white Caucasian)	−1.307	0.191
Migrant status	−1.565	0.069
Age (at entry)	0.004	0.966
Education (in years)	0.073	0.425
DUI (in weeks)	0.052	0.566
Past specialist contact	−0.536	0.592
Family history of psychosis	−1.657	0.098
Current substance abuse	−1.606	0.108
CHR-P subgroups		
APS	−0.508	0.612
BLIPS	−0.348	0.728
PANSS score		
Positive symptoms	0.100	0.269
Negative symptoms	0.164	0.071
Disorganization	0.252	0.005
Affect	0.412	0.0001
Resistance/excitement-activity	−0.006	0.946
Total score	0.292	0.001
PANSS "Lack of judgment and insight" item 12	−0.032	0.728
GAF score	−0.156	0.084
HoNOS score		
Behavioral problems	−0.065	0.475
Impairment	−0.029	0.753
Psychiatric symptoms	0.265	0.003
Social problems	−0.038	0.677
Total score	0.079	0.384

Note. CHR-P = Clinical High Risk for Psychosis; CAARMS = Comprehensive Assessment of At-Risk Mental States; OCS = Obsessive-Compulsive Symptoms; PANSS = Positive And Negative Syndrome Scale; Duration of Untreated Illness; APS = Attenuated Psychotic Symptoms; BLIPS = Brief Limited Intermittent Psychotic Symptoms; PANSS = Positive And Negative Syndrome Scale; GAF = Global Assessment of Functioning; HoNOS = Health of the Nation Outcome Scale; p = statistical significance. Spearman rank correlation (ρ) and Mann-Whitney U test (z) values are reported. Statistically significant *p* values are in bold. Bonferroni's corrected p values are reported.

significant positive correlations with T0-T2 delta PANSS total scores, T0-T2 delta "Negative Symptoms" and "Affect" factor subscores, and T0-T2 delta HoNOS "Psychiatric Symptoms" scores, as well as a statistically relevant negative correlation with T0-T2 GAF score (Table 3).

Table 3
Longitudinal association between obsessive-compulsive symptoms and other clinical parameters in the CHR-P total sample across the 2-year follow-up period.

Variable	T0 (n = 180)	T1 (n = 175)	T2 (n = 153)	T0-T1 (p)	T0-T2 (p)	T1-T2 (p)
CAARMS item 7.6 scores	1.37 (2.00)	0.91 (1.58)	1.06 (1.64)	−3.187 (0.001)	−3.027 (0.002)	−0.277 (0.821)

Variable (n = 153)	T0-T2 CAARMS item 7.6 score (ρ/z)	p
Gender	−0.960	0.337
Ethnic group (white Caucasian)	−0.572	0.567
Migrant status	−0.973	0.331
Age (at entry)	0.042	0.679
Education (in years)	−0.014	0.888
DUI (in weeks)	−0.036	0.720
Past specialist contact	−0.346	0.729
Family history of psychosis	−1.445	0.088
Current substance abuse	−1.260	0.208
CHR-P subgroups		
APS	−1.853	0.064
BLIPS	−1.372	0.170
T0-T2 PANSS scores		
Positive symptoms	0.242	0.065
Negative symptoms	0.264	0.008
Disorganization	0.189	0.059
Affect	0.361	0.0001
Resistance/Excitement-Activity	0.097	0.335
Total score	0.265	0.008
T0-T2 GAF score	−0.223	0.025
T0-T2 HoNOS score		
Behavioral problems	0.002	0.983
Impairment	0.209	0.066
Psychiatric symptoms	0.296	0.003
Social problems	0.062	0.536
Total score	0.196	0.052

Note. CHR-P = Clinical High Risk for Psychosis; CAARMS = Comprehensive Assessment of At-Risk Mental States; PANSS = Positive And Negative Syndrome Scale; Duration of Untreated Illness; APS = Attenuated Psychotic Symptoms; BLIPS = Brief Limited Intermittent Psychotic Symptoms; T0 = baseline assessment time; T2 = 2-year assessment time; p = statistical significance; GAF = Global Assessment of Functioning; HoNOS = Health of the Nation Outcome Scale. Mean (standard deviation), Wilcoxon test (z), Spearman rank correlation (ρ), and Mann-Whitney U test (z) values are reported. Bonferroni's corrected p values are reported. Statistical significant p values are in bold.

As for longitudinal associations between OCS and the specialized treatment components provided within the PARMS program, we notably observed a temporally stable relationship between improvement in OCS severity levels and equivalent doses of fluoxetine (mg/day) prescribed at both T1 and T2 (Table 4). Moreover, we found a significant association between decrease in OCS levels and intensity of individual psychotherapy sessions, especially in the first year of treatment.

3.3. Outcome analysis

In this investigation, CHR-P/OCS- participants showed a higher 2-year incidence rate of service disengagement compared to the CHR-/OCS+ subgroup (Table 5). Moreover, the CHR-P/OCS+ subgroup showed a statistical trend ($0.05 < p < .01$) for a lower 1-year incidence in PANSS symptomatic remission (Table 6).

4. Discussion

The results of this study showed that 36.7 % of CHR-P individuals exhibited OCS at baseline and 25 % reported OCS that significantly interfered with their daily socio-occupational functioning. These findings are slightly higher than the OCS prevalence (21.4 %) reported in a recent meta-analysis (Martinho et al., 2023), probably due on different criteria used to define CHR-P and OCS in different investigations (Soyata et al., 2018). Furthermore, our baseline OCS rate is also higher than the lifetime prevalence of OCS (11 %) reported in a previous research (Zink et al., 2013) and much larger than that (8.7 %) observed in the general population (Angst et al., 2004). OCS in CHR-P individuals sometimes could reflect underlying abnormalities in their experience of self, which could contribute to the development of psychosis (e.g., thought interference or perseveration). In this resepct, schizophrenia spectrum disorders are characterized by fundamental disturbances in the sense of self, including what can be described as a diminished sense of "mine-ness" or "hypseity", in which the individual's pre-reflective awareness of being the subject of his or her own experiences is somewhat impaired (Henriksen et al., 2021). Parnas et al. (2020) described how these disorders of the basic structure of subjectivity include experiences of existence as a unified, embodied, temporally stable and bounded subject. Disorders of the self often manifest as disturbances in the sense of coherence and boundaries of the self. Patients may report experiences of derealization, depersonalization, and cognitive disintegration, which reflect a deeper and more pervasive disturbance of self-experience.

However, while OCS were relatively common in our CHR-P sample, a formal (DSM-5) diagnosis of OCD was less frequent, only occurring in 12.2 % subjects of the CHR-P/OCS+ subgroup, with a 4.4 % prevalence in the total CHR-P population. This findings is approximately half of that (7.9 %) reported in the recent meta-analysis by Martinho et al. (2023), but is slightly higher than that (3.5 %) found in the general population. Overall considered, our results confirm the possibility of a substantial comorbidity between OCS and early psychotic states (Hur et al., 2012).

In clinical practice, the broad criteria for OCD in DSM-5, which allow for a diagnosis even when insight is absent, may lead to confusion and misdiagnosis. Patients with schizophrenia may be mistakenly diagnosed with OCD if their obsessive-like symptoms are not carefully evaluated within the context of their overall psychopathology using a phenomenological framework. This can result in inappropriate treatment strategies that fail to address the underlying schizophrenia spectrum disorder. True obsessions, observed in obsessive compulsive disorder, are marked by a struggle against intrusive thoughts, which are immediately experienced as nonsensical and irrational. This internal resistance is a key feature that distinguishes true OCD from the obsession-like symptoms observed in schizophrenia-spectrum disorders. (Rasmussen and Parnas, 2022). The phenomenological perspective emphasizes the importance of understanding these subjective experiences to accurately identify and therefore treat early psychosis. Therefore, it is crucial for clinicians to conduct a comprehensive assessment that includes a thorough exploration of self-disorders using The Examination of Anomalous Self-Experience (EASE), which is a semi-structured clinical interview specifically designed to assess a range of subjective experiences providing a structured framework for assessing these subjective experiences. EASE assesses a range of self-disorders, such as diminished sense of basic self, unstable self-demarcation, and altered first-person perspective, which are not typically addressed by standard diagnostic criteria (Parnas et al., 2005).

Moreover, our evidence that no inter-group difference in terms of baseline AP exposure was found, coupled with early 20th century reports of comorbidity between OCS and psychosis before the use of AP medications (Westphal, 1877; Kraepelin, 1909), suggests that there is a real co-occurrence of OCS and psychotic symptoms that may go beyond the iatrogenic effects of APs (Martinho et al., 2023). In this respect, there seems to be an increase in OCD/OCS prevalence as population progress from healthy to at-risk to established first-episode psychosis (Fontenelle et al., 2011). However, our findings do not allow prove if this co-occurrence involves two disorders that aggregate due to shared neurobiological mechanisms (Poletti et al., 2022b).

Compared to CHR-P/OCS- at baseline, CHR-P/OCS+ individuals

Table 4
CAARMS "Obsessive-compulsive symptoms" item subscores and their associations with clinical features and specialized treatment components of the PARMS program in the CHR-P total sample across the 2-year follow-up period.

T0-T1 CAARMS item 7.6 score (n = 175)	B	SE	β	p	95 % CI Lower	Upper	$R^2 = 0.139$ $F_{[df=7]} = 2.659$ $p = .014$
Constant	0.031	0.204	–	0.878	−0.374	0.437	
T0 equivalent dose of chlorpromazine (mg/day)	0.012	0.084	0.016	0.891	−0.155	0.178	
T0 equivalent dose of fluoxetine (mg/day)	−0.003	0.002	−0.143	0.161	−0.007	0.001	
T1 equivalent dose of chlorpromazine (mg/day)	−0.016	0.075	−0.024	0.835	−0.163	0.132	
T1 equivalent dose of fluoxetine (mg/day)	0.004	0.002	0.238	**0.021**	0.001	0.008	
T1 number of individual psychotherapy sessions	0.046	0.017	0.340	**0.009**	0.012	0.080	
T1 number of family psychoeducation sessions	−0.034	0.039	−0.108	0.391	−0.111	0.044	
T1 number of case management sessions	0.004	0.005	0.068	0.463	−0.006	0.014	

T1-T2 CAARMS item 7.6 score (n = 153)	B	SE	β	p	95 % CI Lower	Upper	$R^2 = 0.286$ $F_{[df=9]} = 4.508$ $p = .0001$
Constant	0.019	0.121	–	0.875	−0.221	0.259	
T0 equivalent dose of chlorpromazine (mg/day)	−0.075	0.044	−0.213	0.096	−0.163	0.013	
T0 equivalent dose of fluoxetine (mg/day)	0.001	0.001	0.143	0.227	−0.001	0.004	
T1 equivalent dose of chlorpromazine (mg/day)	0.004	0.058	0.013	0.945	−0.111	0.119	
T1 equivalent dose of fluoxetine (mg/day)	0.006	0.001	0.707	**0.0001**	0.004	0.008	
T2 equivalent dose of chlorpromazine (mg/day)	0.061	0.071	0.149	0.394	−0.081	0.203	
T2 equivalent dose of fluoxetine (mg/day)	0.008	0.002	0.836	**0.0001**	0.005	0.011	
T2 number of individual psychotherapy sessions	0.000	0.004	0.010	0.937	−0.008	0.009	
T2 number of family psychoeducation sessions	−0.004	0.008	−0.065	0.603	−0.019	0.011	
T2 number of case management sessions	0.001	0.001	0.130	0.166	−0.001	0.003	

T0-T2 CAARMS item 7.6 score (n = 153)	B	SE	β	p	95 % CI Lower	Upper	$R^2 = 0.188$ $F_{[df=9]} = 2.339$ $p = .020$
Constant	0.049	0.265	–	0.854	−0.477	0.575	
T0 equivalent dose of chlorpromazine (mg/day)	−0.016	0.097	−0.022	0.868	−0.209	0.177	
T0 equivalent dose of fluoxetine (mg/day)	−0.004	0.003	−0.187	0.141	−0.009	0.001	
T1 equivalent dose of chlorpromazine (mg/day)	−0.041	0.127	−0.063	0.746	−0.294	0.211	
T1 equivalent dose of fluoxetine (mg/day)	0.007	0.002	0.400	**0.008**	0.002	0.012	
T2 equivalent dose of chlorpromazine (mg/day)	0.064	0.156	0.076	0.684	−0.247	0.374	
T2 equivalent dose of fluoxetine (mg/day)	0.002	0.003	0.091	0.589	−0.001	0.005	
T2 number of individual psychotherapy sessions	0.020	0.009	0.289	**0.031**	0.002	0.039	
T2 number of family psychoeducation sessions	−0.012	0.016	−0.096	0.473	−0.045	0.021	
T2 number of case management sessions	0.003	0.002	0.119	0.235	−0.002	0.007	

Note – CAARMS = Comprehensive Assessment of At-Risk Mental States; PARMS = Parma At-Risk Mental States; CHR-P = Clinical high Risk for Psychosis. T0 = baseline assessment time; T1 = 1-year assessment time; T2 = 2-year assessment time; DUI = Duration of Untreated Illness; B = regression coefficient, SE = Standard Error, 95 % CI = 95 % Confident Intervals for B, β = standardized regression coefficient; p = statistical significance, R2 = R-squared or coefficient of determination, F = statistic test value for linear regression, df = degrees of freedom. Statistically significant p values are in bold.

exhibited higher severity levels of psychopathology (i.e., PANSS total score), especially in terms of positive and anxious-depressive symptoms. While confirming that the presence of OCS in CHR-P subjects was related to more severe positive features (Cunill et al., 2009; Fontenelle et al., 2011), our findings notably indicate that the OCS severity can be considered as a psychopathological index of greater severity of the general clinical picture at presentation, especially in terms of high levels of disorganization and heightened emotional/affective suffering. The statistical relationship between OCS and depressive dimension in our CHR-P sample was strengthened by both the greater likelihood of antidepressant prescription and the higher mean equivalent dose of fluoxetine prescribed at entry in the CHR-P/OCS+ subgroup compared to CHR-P/OCS- subjects. In this respect, Fontenelle et al. (2011) reported that CHR-P individuals who displayed OCD and psychosis were characterized by greater severity of depression both before and after psychosis conversion. However, the association between OCS and depression in the CHR-P population was not replicated in the recent meta-analysis conducted by Martinho et al. (2023).

Over the course of our 2 years of follow-up, a statistically significant decrease in OCS severity levels was observed. Specifically, OCS longitudinal reduction seems to be primarily attributable at the first year of intervention. Indeed, we did not observe further improvement in OCS severity levels during the second year of observation. This plateau effect could be interpreted in the light of the evidence that the intensity of EIP treatments offered to our CHR-P individuals (especially psychosocial interventions) was usually higher in the first 12 months (Pelizza et al., 2022). In this respect, the PARMS program specifically indicates that booster sessions should be preferably provided in the second year of treatment (Pelizza et al., 2022). In this sense, maintaining the same intervention intensity also during the second 12 months of the PARMS protocol could further improve response to treatment of OCS.

The results of this study also showed a significant association between longitudinal changes in OCS and general psychopathology severity levels (i.e., PANSS total scores), especially in terms of affective features. This confirms that the role of OCS as psychopathological index of clinical severity in CHR-P subjects is stable and persistent overtime, and significantly contributes to determine the overall degree of intensity of individual clinical suffering.

The close relationship between OCS and the severity of clinical picture is further supported by our findings on significant longitudinal associations of changes in OCS levels with improvements in negative symptoms and daily functioning (i.e., GAF scores). These results are

Table 5
Univariate Cox proportional-hazard models for 2-year time-to-event outcome parameters in the two CHR-P subgroups (n = 180).

Variable	CHR-P/OCS+ (n = 66)	CHR-P/OCS- (n = 114)	Statistic test			
			HR	95 % IC		p
				Lower	Upper	
1-year psychosis transition	9 (13.6 %)	12 (10.5 %)	1.301	0.548	3.087	0.551
1-year new hospitalization	8 (12.1 %)	16 (14.0 %)	0.867	0.371	2.026	0.742
1-year new suicide attempt	4 (6.1 %)	4 (3.5 %)	1.734	0.434	6.935	0.436
1-year new self-harm	11 (16.7 %)	17 (14.9 %)	1.122	0.526	2.396	0.766
1-year service disengagement	3 (4.5 %)	8 (7.0 %)	0.649	0.172	2.446	0.523
2-year psychosis transition	11 (16.7 %)	18 (15.8 %)	1.027	0.485	2.174	0.945
2-year new hospitalization	8 (12.1 %)	18 (15.8 %)	0.759	0.330	1.747	0.517
2-year suicide attempt	5 (7.6 %)	8 (7.0 %)	1.044	0.341	3.192	0.940
2-year self-harm behavior	7 (10.6 %)	13 (11.4 %)	0.899	0.358	2.254	0.820
2-year service disengagement	5 (7.6 %)	22 (19.3 %)	0.394	0.149	1.040	0.034

Note. CHR-P = Clinical High Risk; OCS = Obsessive-compulsive symptoms; CHR-P/OCS+ = CHR-P individuals with baseline OCS; CHR-P/OCS- = CHR-P individuals without baseline OCS; GAF = Global Assessment of Functioning; HoNOS = Health of the Nation Outcome Scale; PANSS = Positive And Negative Syndrome Scale; HR = Hazard Ratio; 95 % CI = 95 % confidence intervals for HR; p = statistical significance. Significant statistical p values are in bold. Cumulative incidence rates are reported.
Suicide attempt = potentially injurious, self-inflicted behavior without a fatal outcome for which there was (implicit or explicit) evidence of intent to die, derived from direct information reported by the patient (or by a relative well informed about the facts) or documented in the clinical notes; Self-harm behavior = acts of deliberate self-harm or intoxication with alcohol or drugs, but where there was no clear intention to die. Service disengagement = complete lack of contact or untraceable for at least 3 months despite a need of treatment, counted from the date of the last face-to-face meeting with the clinical staff.

substantially in line with what was reported in previous studies (Hur et al., 2012; Martinho et al., 2023), suggesting that as OCS worsened or remained unchanged, this was within a relevant decline in the overall level of individual functioning.

The temporally stable relationship between severity levels of OCS and affective symptoms remains of particular psychopathological interest and may be variously interpreted. First, OCS could be considered as a clinical index of severe depression, directly contributing to the overall level of emotional suffering in CHR-P individuals, right from recruitment into specialized EIP programs (Preti et al., 2022). Alternatively, OCS and some depressive thought disturbances (such as rumination) could share the same pathological formal process of ideation (e.g., intrusiveness, repetitiveness, egosyntonia), with consequent co-occurrence of similar thought mechanisms (Strauss et al., 2023).

As for specialized treatment components provided within the PARMS program, we observed a temporally stable association between improvements in OCS severity levels and equivalent doses of fluoxetine (mg/day) prescribed at both T1 and T2. This supports that antidepressant therapy may play a consistent role in reducing OCS in CHR-P individuals, as well as in decreasing their depressive features. Furthermore, our findings showed a significant association between decreased OCS levels and the intensity of individual psychotherapy sessions offered in the first year of treatment. Therefore, implementing psychotherapy treatments specifically focused on obsessive-compulsive features IN people at CHR-P (Poletti and Raballo, 2019) and maintaining a high intensity of individual psychotherapy sessions during the next 1–2 years of EIP intervention could further reduce OCS severity levels and favor general psychological well-being.

As for outcome analysis, the CHR-P/OCS- subgroup interestingly exhibited a higher 2-year incidence rate of service disengagement compared to the CHR-P/OCS+ subsample. This was particularly evident for the OCS subgroup that experienced OCS interfering with daily socio-occupational functioning (hazard ratio [HR] = 0.112; 95 % confidence intervals for HR = 0.015–0.823; p = .031). Evidence that CHR-P individuals with OCS displayed a higher rate of service engagement might indicate potential inter-group differences in help-seeking behavior, treatment adherence, or factors affecting engagement in EIP services. Specifically, together with the related overall severity of psychopathology over time, the presence of OCS within the CHR-P population might directly contribute to greater clinical attention by mental health professionals and (consequently) to better service engagement in the long term. Finally, the statistical trend toward lower rates of PANSS symptomatic remission within the CHR-P/OCS+ subgroup indicates that the improvement in OCS might impact the overall trajectory of symptomatic remission in CHR-P individuals, reflecting the importance in addressing both psychotic and obsessive-compulsive symptoms concurrently to favor clinical recovery in CHR-P subjects.

4.1. Limitations

The study has noteworthy limitations. Firstly, the identification of OCS relied solely on a single-item assessment, lacking a comprehensive evaluation of aspects like the content of obsessions, compulsions, and insight level. A more in-depth approach, incorporating a dedicated scale like the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS) (Goodman et al., 1989), could provide a more nuanced understanding of these symptoms within the study population. Moreover, as OCS could be prodromal characteristics of CHR-P mental states as subjective anomalies of self experience, future studies using specific instruments for the assessment of subjectivity (such as the EASE) are also needed.

Secondly, the absence of neurocognitive tests is another limitation. The inclusion of neurocognitive tasks could have provided valuable insights into cognitive functioning, potential deficits, and how these relate to the observed clinical outcomes.

Lastly, the study's relatively small CHR-P subgroup raises concerns about low incidence rates in outcome parameters. Conducting further investigations with larger CHR-P populations is necessary to address these limitations effectively.

5. Conclusions

The results of our investigation revealed significant insights into the presence of OCS in individuals at CHR—P. Notably, more than a third of CHR-P subjects exhibited OCS at presentation, with a significant subset (about a quarter) reporting OCS that significantly interfered with their daily socio-occupational functioning. This relevant prevalence of OCS suggests the need for targeted interventions on OCS in the CHR-P population. Indeed, in this research, the CHR-P/OCS+ subgroup also experienced a greater overall severity of psychopathology (including heightened positive and affective symptoms) both at baseline and across the follow-up, necessitating tailored treatment strategies.

Our longitudinal findings revealed that OCS severity levels primarily decreased within the first year of treatment (yet plateaued thereafter), emphasizing the importance in managing these symptoms over time (especially combining antidepressant therapy and individual psychotherapy). This encourages the development of integrated, multi-facet, patient-specific interventions and further research to optimize care for

Table 6
Binary logistic regression analysis results for 2-year not time-to-event outcome variables by CHR-P subgroup (n = 180).

Dependent variable	CHR-P/OCS+ (*n* = 66)	CHR-P/OCS- (*n* = 114)	Statistic test				
			B (SE)	HR	95 % CI		p
					Lower higher		
1-year CHR-P criteria persistence	31 (47.0 %)	52 (46.0 %)	−0.038 (0.311)	0.962	0.524	1.769	0.902
1-year current suicidal ideation	26 (41.9 %)	38 (34.5 %)	0.314 (0.326)	1.368	0.722	2.549	0.336
1-year functional recovery	35 (53.0 %)	68 (59.6 %)	−0.270 (0.312)	0.764	0.414	1.407	0.388
1-year GAF functional remission	40 (60.6 %)	66 (57.9 %)	0.112 (0.315)	1.119	0.603	2.076	0.722
1-year HoNOS functional remission	46 (69.7 %)	82 (71.9 %)	−0.108 (0.339)	0.898	0.462	1.746	0.750
1-year PANSS symptomatic remission	30 (45.5 %)	67 (58.8 %)	−0.537 (0.312)	0.585	0.317	1.077	0.085
1-year persistent negative symptoms	7 (10.6 %)	16 (14.0 %)	−0.319 (0.482)	0.727	0.282	1.870	0.508
2-year CHR-P criteria persistence	24 (36.4 %)	37 (32.5 %)	0.173 (0.325)	1.189	0.629	2.248	0.594
1-year current suicidal ideation	24 (36.4 %)	41 (36.0 %)	0.017 (0.322)	1.017	0.541	1.912	0.957
2-year functional recovery	41 (62.1 %)	75 (65.8 %)	−0.159 (0.322)	0.853	0.454	1.601	0.620
2-year GAF functional remission	41 (62.1 %)	75 (65.8 %)	−0.159 (0.322)	0.853	0.454	1.601	0.620
2-year HoNOS functional remission	51 (77.3 %)	96 (84.2 %)	−0.450 (0.390)	0.638	0.297	1.370	0.249
2-year PANSS symptomatic remission	48 (72.7 %)	87 (76.3 %)	−0.189 (0.353)	0.828	0.414	1.654	0.592
2-year persistent negative symptoms	8 (12.1 %)	12 (12.5 %)	0.159 (0.485)	1.172	0.453	3.043	0.743

Note. CHR-P = Clinical High Risk; OCS = Obsessive-compulsive symptoms; CHR-P/OCS+ = CHR-P individuals with baseline OCS; CHR-P/OCS- = CHR-P individuals without baseline OCS; GAF = Global Assessment of Functioning; HoNOS = Health of the Nation Outcome Scale; PANSS = Positive And Negative Syndrome Scale; B = regression coefficient, SE = Standard Error; HR = Hazard Ratio; 95 % CI = 95 % confidence intervals for HR; p = statistical significance. Significant statistical p values are in bold. Cumulative incidence rates are reported.
Current suicidal ideation = score of ≥2 on item 4 ("Suicidality") of the Brief Psychiatric Rating Scale (BPRS), corresponding at least to occasional suicidal thinking without specific plans; Functional recovery = return to work/school; GAF functional remission = GAF score ≥ 60; HoNOS functional remission = HoNOS item 9, 10 and 11 subscores >2; PANSS symptomatic remission = PANSS item P1, P2, P3, N1, N4, N6, G5, G9 subscores ≤3; Persistent negative symptoms = (a) presence of at least moderate (i.e., a score of 4 on the PANSS) for at least 3 negative symptoms or at least moderately severe (i.e., a score of 5 on the PANSS) for at least 2 negative symptoms + (b) persistence of negative symptoms for at least 6 months and for an extended period of time prior to the study beginning (e.g., at least 4 weeks) + (c) absence of relevant levels of positive symptoms, depression and extrapyramidal symptoms.

individuals facing the dual challenges of OCS and CHR-P psychopathology.

Finally, the clinical relevance of OCS/OCD prevalence further supports the notion that the CHR-P population is almost heterogeneous. In this sense, CHR-P subjects with OCS/OCD could represent a distinct subtype with different clinical, functional, and neurobiological characteristics, leading to unique diagnostic, therapeutic, and prognostic implications. Recognizing this heterogeneity within the CHR-P population is essential for tailoring interventions and optimizing outcomes for individuals facing a diverse range of challenges, including the co-occurrence of OCS and CHR-P features.

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CRediT authorship contribution statement

Di Lisi Alessandro: Writing – original draft, Writing – review & editing. **Emanuela Quattrone:** Data curation, Writing – review & editing. **Silvia Azzali:** Data curation, Writing – review & editing. **Giuseppina Paulillo:** Writing – review & editing. **Simona Pupo:** Data curation, Formal analysis, Writing – review & editing. **Pietro Pellegrini:** Writing – review & editing. **Menchetti Marco:** Writing – review & editing. **Pelizza Lorenzo:** Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing.

Declaration of competing interest

None.

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Appendix A. Supplementary data

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