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Original Article

Obsessive-compulsive disorder with comorbid social anxiety symptoms is a more severe presentation associated with greater autistic traits

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SUMMARY

Introduction and aims

Recent literature highlighted significant clinical and epidemiological overlap of Obsessive compulsive disorder (OCD) with Social Anxiety Disorder (SAD) and autism spectrum. In this perspective we aimed to evaluate the relationship between autism spectrum, OCD and social anxiety in a sample of patients with OCD with or without significant SAD symptoms.

Methods

We recruited a total sample of 56 in- or out-patients with a clinical diagnosis of OCD assessing them with the Social Phobic Spectrum – Short Version (SHY-SV), the Obsessive-Compulsive Spectrum – Short Version (OBS-SV) and the Adult Autism Subthreshold Spectrum (AdAS Spectrum) questionnaires. Participants were divided in two groups: OCD and OCD with SAD group.

Results

OCD+SAD subjects scored significantly higher than OCDs in AdAS Spectrum Restricted interests and Rumination domain as well as in the questionnaire total score and in OBS-SV Repetition and automation domain as well as in its total score. Moreover, AdAS Spectrum total score was a significant positive predictor of the presence of SAD. Finally, AdAS Spectrum Restriced Interest & Rumination and OBS-SV Repetition and automation emerged as significant positive predictors of the presence of SAD.

Conclusions

Our work highlighted that subjects with OCD and clinical SAD symptoms show a higher global severity of OCD symptoms and a higher presence of autistic traits. On the other hand, SAD presence in OCD subjects seems to be statistically predicted by AdAS Spectrum but not by OBS-SV total score.

Key words: Autism spectrum disorder, obsessive-compulsive disorder, social anxiety disorder, autistic traits, psychopatology.

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Introduction

Obsessive-compulsive disorder (OCD) is a widespread condition, often underdiagnosed and untreated [1], characterized by the presence of recurrent obsessions and/or compulsions leading to a marked deterioration in the subject's behavior [2]. Obsessions are described as recurrent and persistent thoughts, impulses or images that are experienced in an ego-dystonic manner, causing significant discomfort or anxiety. The subject attempts to ignore or suppress these thoughts or to neutralize them through other thoughts or actions, implementing a compulsion [2]. Recent literature reported that women are 1.6 times more likely to develop OCD than men, with a lifetime prevalence of 1.5% in women and 1% in men [3]. Furthermore, young adults seem to have a greater risk to develop OCD [3]. The concept of the disorder has changed over the years. Firstly included among phobias or

anxiety disorders [4], it is only through the current nosography that OCD gains a section of its own together with similar disorders [4]. Moreover, OCD frequently occurs in comorbidity with other disorders such as mood, eating disorders, panic disorder and Tourette syndrome, as well as social phobia [5].

Recent literature highlighted a high comorbidity between OCD and social anxiety disorder (SAD), with SAD as the most represented anxiety disorder in the OCD population [5] increasing the severity of this condition [5]. Indeed, the association with anxiety disorders seems to lower the OCD age of onset by enhancing the development of hoarding and cognitive compulsions, pathological doubt, checking rituals [5]. While the presence of both the disorders may increase the risk of developing other psychiatric conditions such as depressive symptoms [6], subthreshold forms of SAD can be found in OCD patients and vice versa. In this framework, it should be noted how several overlapping features are detectable between SAD and ASD, which, in the framework of a dimensional approach, may share a common cognitive core [7].

At the same time, OCD is frequently associated with autism spectrum disorder (ASD) or subthreshold autistic traits [8]. A proper differential diagnosis between the two condition may became challenging due to the presence of overlapping features, such as the repetitive and stereotyped symptomatology [8]. In this perspective, ASD subjects have a risk of developing OCD that is twice as high compared to the general population, with a comorbidity ranging between 6 to 37% [9]. Furthermore, authors reported 4-8% of OCD children and adolescents are later diagnosed with ASD [9]. The connection between the two disorders is gaining increasing interest, including in a dimensional approach: recent studies highlighted that, besides comorbidities among full-blown presentations, ASD subjects often show higher obsessive-compulsive traits, while OCD patients report an increased presence of subthreshold autistic features [10,11].

Moreover, the association between ASD and SAD is also well-known, especially among females [10].

Similarly to ASD, SAD patients frequently show interpersonal problems and poor social relationships actively avoiding social situations that seriously compromise their functioning and well-being [2]. The lifetime prevalence of SAD appears to be overrepresented in ASD subjects, mainly among youth [12]. ASD youths reported SAD rates ranging from 7% to 30%, while studies on adults found higher percentages [13]. Interestingly, a growing field of literature highlighted the presence of autistic traits underlying SAD [10]. The overlap between SAD and ASD symptoms may result in a delayed diagnosis of ASD, due to the higher prevalence of SAD in the younger population [13]. On the other hand, high-functioning ASD patients may mask their social impairment through raffinate coping strategies [2].

While 70% of ASD subjects present at least a concomitant psychiatric disorder, with anxiety disorders, social phobia, and OCD being extremely frequent [14]. Considering the wide comorbidities and shared clinical features among ASD, OCD and SAD spectra, some authors also hypothesized that the clinical and epidemiological overlap among these conditions may be modulated by a similar neurodevelopmental alteration, related to the autism spectrum, leading to a mutual reinforcement of the three classical psychiatric categories [11]. In this framework, the present study aimed to evaluate the relationship between autism spectrum, OCD and social anxiety in a sample of patients with OCD with or without significant SAD symptoms.

Materials and methods

Study sample and procedures

We recruited a total sample of 56 in- or out-patients with a clinical diagnosis of Obsessive-Compulsive Disorder (OCD). Subjects with mental disability, poor collaboration skills, an age under 18, language or intellectual impairment that would make it difficult to complete the exams, and continuous psychotic symptoms were excluded from the recruitment procedures. The study was conducted in accordance with the Declaration of Helsinki and the local Ethical Committee approved the study protocol. All participants provided a written informed consent following a thorough explanation of the study and a chance for questions.

All participants were evaluated with the Social Phobic Spectrum – Short Version (SHY-SV), the Obsessive-Compulsive Spectrum – Short Version (OBS-SV) and the Adult Autism Subthreshold Spectrum (AdAS Spectrum) questionnaire.

Measures

The SHY-SV

The SHY-SV is a questionnaire designed to assess the full range of symptoms, atypical signs, and personality traits associated with social anxiety. It consists of 139 items categorized into 5 domains: ***Performance, Interpersonal sensitivity, Behavioral inhibition, Substance abuse***, and ***Social situations***, and 1 appendix investigating ***Childhood and Adolescence***. The SHY-SV demonstrated excellent test-retest reliability and convergent validity with other dimensional measures of SAD in the validation research. The questionnaire also has a validated cut-off score of 37 for the presence of clinical SAD [15].

The OBS-SV

The OBS-SV is a self-report questionnaire designed to assess distinct presentations, temperamental traits, and

other clinical and subclinical aspects, as well as the standard symptoms, of OCD. It is made of 139 items with binary answers divided across six domains: Doubt dimension, Hypercontrol, Temporal dimension, Perfectionism, Repetition and automation, and Obsessive themes, and two appendices: Childhood and adolescence and Impulsivity and loss of control. The validation study found significant convergent validity with other OCD measures, excellent internal consistency, and test-retest reliability [16].

The AdAS Spectrum

The AdAS Spectrum questionnaire is a 160-item self-report measure used to assess a wide variety of autism-related symptoms in individuals without cognitive or language impairments. The questionnaire is organized in 7 domains: Childhood and adolescence, verbal and nonverbal communication, empathy, inflexibility and adherence to routine, restricted interests and rumination, and hyper- and hyporeactivity to sensory input. The questionnaire demonstrated strong internal consistency, outstanding test-retest reliability, and convergent validity with other dimensional measures of the autism spectrum were seen in the validation research [17].

Statistical analysis

The sample was divided in two groups based on the SHY-SV cut-off score of 37 for the presence of a Social Anxiety Disorder (SAD). Chi-square and t-student tests were used to compare sociodemographic characteristics between the two diagnostic groups. Student t-tests were then used to compare AdAS Spectrum total and domains scores as well as OBS-SV total and domain scores between groups.

Then, using the presence of SAD as dependent variable and AdAS Spectrum and OBS-SV total scores as independent variables, a stepwise logistic regression analysis was performed in order to investigate the presence of possible statistical predictors of the presence of SAD. A second stepwise logistic regression was performed using the same dependent variable and AdAS Spectrum and OBS-SV domain scores as independent variables. The Hosmer-Lemeshow test was used to confirm the model's predictive accuracy (goodness-of-fit), while the VIF was utilized to detect multicollinearity.

All statistical analyses were performed with SPSS version 26.0.

Results

The total sample was made of 17 subjects with OCD and concomitant SAD (F = 8; M = 9; mean age: 40.05±11.98 years) and 39 subjects only with OCD (F = 23; M = 16; mean age: 41.24±11.05 years). The two groups did not significantly differ for age nor for gender (Tab. I). S student t-test results reported in Table II highlighted how OCD+SAD subjects scored significantly higher

TABLE I. *Age and gender comparison between diagnostic groups.*

		OCD	OCD+SAD					
		mean±SD	mean±SD	t	p	I.C. 95% Lower	Upper	Cohen's D
Age		40.05±11.98	41.24±11.05	-.348	.729	-8,008	5,640	-,101
		n(%)	n(%)	Chi-square	p			
Gender	F	23 (59%)	8 (47%)	.680	.410			
	M	16 (41%)	9 (53%)					

TABLE II. *Comparison of scores reported on AdAS Spectrum between groups.*

	OCD Mean±SD	OCD+SAD *Mean±SD*	t	p	I.C. 95% Lower	Upper	Cohen's D
Child/Adolesc.	9.08±5.01	10.76±6.34	-1.068	.290	-4,85532	1,47975	-.310
Verbal Comm.	5.87±3.99	7.29±4.55	-1.176	.245	-3,84804	1,00340	-.342
Non verbal Comm.	7.13±5.10	8.59±6.23	-.919	.362	-4,6440	1,72399	-.267
Empathy	2.59±2.37	3.76±3.36	-1.496	.141	-2,74985	,39992	-.435
Inflex. & Adher. to routine	18.56±8.18	22.35±10.46	-1.461	.150	-8,98682	1,40915	-.425
Restricted interests and Rumination	7.54±4.67	10.29±4.09	-2.103	.040*	-5,38215	-,12917	-.611
Hyper/Hyporeact. to sensory inputs	1.97±2.00	2.47±2.40	-.801	.426	-1,73787	,74542	-.233
Total score	52.74±19.53	65.53±18.33	-2.293	.026*	-23,96448	-1,60717	-.666

than OCDs in AdAS Spectrum Restricted interests and Rumination domain as well as in the questionnaire total score. Moreover, OCD+SAD subjects scored significantly higher than OCDs in OBS-SV Repetition and automation domain as well as in its total score (Tab. III). A logistic regression with the presence of SAD as dependent variable and AdAS Spectrum and OBS-SV total scores as independent variables highlighted that AdAS Spectrum total score was a significant positive predictor of the presence of SAD (Tab. IV). Considering the logistic regression analysis performed using the presence of SAD as dependent variable and AdAS Spectrum and OBS-SV domains as independent variables, AdAS Spectrum Restriced Interest & Rumination and OBS-SV Repetition and automation emerged as significant positive predictors of the presence of SAD (Tab. V). Hosmer-Lemeshow test reported a satisfying goodness-of-fit, while the VIF confirmed limited collinearity.

TABLE III. *Comparison of scores reported on OBS-SV between groups.*

	OCD *Mean±SD*	OCD+SAD *Mean±SD*	t	p	I.C. 95% Lower	Upper	Cohen's D
Doubt	5.13±1.87	5.29±2.17	-.291	.772	-1,30917	,97734	-.085
Hypercontrol	17.61±5.34	19.41±5.29	-1.161	.251	-4,89926	1,30650	-.337
Temporal dimension	3.41±1.79	3.88±1.65	-.929	.357	-1,49124	,54704	-.270
Perfectionism	7.77±2.99	8.65±4.20	-.891	.377	-2,85346	1,09781	-.259
Repetition and automation	2.97±1.83	4.59±2.03	-2.937	.005*	-2,71570	-,51206	-.853
Obsessive themes	9.31±4.38	10.18±4.45	-.680	.500	-3,43173	1,69417	-.198
Total Score	46.20±9.98	52.00±9.29	-2.039	.046*	-11,49306	-,09668	-.593
Childhood and adolescence	7.41±3.26	6.76±3.75	.651	.518	-1,34228	2,63338	.189
Impulsivity and loss of control	5.43±4.20	5.82±3.63	-.330	.743	-2,74256	1,96730	-.096

TABLE IV. *logistic regression analysis with AdAS Spectrum and OBS-SV total scores as independent variables and the presence of SAD as dependent variable (only variables in the significant equation reported in table).*

		B(SE)	p	Exp(B)	CI 95% Lower bound	CI 95% Upper bound	VIF
STEP 1	constant	-2.947(1.071)	.006*	.052			
	AdAS Spectum total score	.036(.017)	.032*	1.036	1.003	1.071	1.000

Step 1. Cox & Snell R^2:.088; Nagelkerke R^2:.125; total correct percentage 71.4%; Hosmer-Lemeshow test: chi-square = 6.007;df = 7; p = .539

TABLE V. *Logistic regression analysis with all AdAS Spectrum and OBS-SV domain scores as independent variables and the presence of SAD as dependent variable (only variables in the significant equation reported in table).*

		B(SE)	p	Exp(B)	CI 95% Lower bound	CI 95% Upper bound	VIF
STEP 1	constant	-2.507(.754)	.001	.082	-	-	-
	OBS –SV Repetition and automation	.445(.173)	.010	1.562	1.114	2.191	1.00
STEP 2	constant	-4.523(1.437)	.002*	.011	-	-	-
	OBS –SV Repetition and automation	.518(.198)	.009*	1.679	1.140	2.475	1.006
	AdAS Spectrum Restricted Interest & Rumination	.194(.097)	.045*	1.215	1.004	1.469	1.006

Step 1. Cox & Snell R^2:.134; Nagelkerke R^2:.189: total correct percentage 73.2%; Hosmer-Lemeshow test: chi-square = 6.171;df = 5; p = .290;
Step2: Cox & Snell R^2:.210; Nagelkerke R^2:.297: total correct percentage 75%; Hosmer-Lemeshow test: chi-square = 4.766;df = 7; p = .689.

Discussion

This study aimed to evaluate social anxiety, obsessive-compulsive and autistic traits in a sample of 56 subjects suffering from obsessive-compulsive disorder (OCD), as well as to evaluate the interrelationship between these different psychopathological dimensions. The sample was firstly divided in two groups, homogenous for gender and age, the basis of the concomitant presence of social anxiety disorder (SAD) according to SHY-SV.

Interestingly, the OCD+SAD group scored significantly higher than the OCD group in the AdAS Spectrum questionnaire total score and in ***Restricted Interests and Rumination*** domain. These results highlighted a significant link between SAD autistic traits (AT), as previously reported in the literature [10]. Indeed, the presence of SAD seems to increase the risk of a diagnosis of autism spectrum disorder (ASD) [13]. Noteworthy, the rates of SAD exceed 50% in ASD patients, significantly higher than the 3-7% estimated in non-ASD subjects [13]. Although ASD and SAD are considered as different conditions, they share several core symptoms, including deficits in social communication and interaction, decreased eye contact, reduced social skills, and impairments in maintaining social relationships [10,11]. Moreover, SAD patients' tendency to the so *called pre and post-event negative rumination*, concerning the anticipation and processing of social events, may be linked the autistic repetitive and intrusive thinking focused on one's inner states which compromises problem-solving skills and the processing of negative feelings, with a tendency to isolation [8,18]. In this framework, social stressing situations may trigger maladaptive coping strategies and unhelpful beliefs (pre-event-rumination), leading to avoidance behaviours and self-focused attention on anxiety reactions contributing to achieve worse performances and a pervasive thinking regarding the failed social task (post-event rumination) [18]. Moreover, some authors hypothesized that other autistic features such as *restricted and repetitive behaviors and interests* (RRBIs) may increase the severity of social difficulties in ASD individuals with SAD [19]. Indeed, high inflexibility and rigidity may hinder adequate emotional reactions to social situations [20]. Stereotyped and repetitive behaviors represent a risk of social adversity such as bullying episodes, leading to social phobia and isolation [21]. RRBIs are also expression of uncertainty intolerance identified as a mediating factor for the development of social settings' anxiety in ASD subjects [22]. At the same time, patients suffering from SAD may manifest intolerance to unknown situations and, consequently, fear of new social situations perceived as ambiguous and potentially embarrassing.

As for the OBS-SV questionnaire, OCD+SAD sample achieved significantly higher scores than the OCD sample in the OBS-SV total score as well as "Repetition and automation" domain. This domain evaluates the self-control and self-surveillance mechanisms present in both obsessive and social phobia conditions. However, as confirmed from literature, in OCD these mechanisms aim to reduce the anxiety deriving from obsessive thoughts, while in SAD a strict self-control process seems to improve the perception of himself towards the other. Indeed, SAD patients often show a deep focus on oneself actions in the social context, typically associated with a negative self-image during the performance that may further increase repetitive self-control and self-surveillance behaviors [23,24]. These results were confirmed by the logistic regression where SAD was the dependent variable while the AdAS and OBS-SV domains the independent variables. Indeed, AdAS Spectrum Restricted Interest & Rumination and OBS-SV Repetition and automation emerged as significant positive predictors for the presence of SAD confirming that the SAD is associated with a pattern of repetitive ruminative thinking and tendency to self-controlling and repetitive behaviours, aiming to cope with the difficulties in social interactions experienced due to the presence of a negative self-image [23,24].

It should be noted how, in the first logistic regression, AdAS Spectrum total score, but not OBS-SV total score, emerged as a significant positive predictor for the presence of SAD, confirming the close link between the autistic dimension and the presence of social anxiety symptoms within this specific population 25. Both SAD and autism spectrum share clinical features such as a marked difficulty in interactions, emotional reciprocity deficit and also the theory of mind alteration. All features that may also expose to stressful social experiences as well as mocking or bullying, frequently reported as traumatic events in autistic and social-phobic patients, increasing ASD and SAD maladaptive behaviours such as avoidance and fear of social experiences [25].

This study should be considered in light of some limitations. First of all, the small sample size that may limit the generalizability of our results, and the imbalance between the two groups with the OCD+SAD being relatively smaller than the OCD one. We used psychometric questionnaires administered in self-report: this method may open to bias related to under- or over-estimation of symptoms by participants. Moreover, the possible partial overlap between questionnaire domains (es. Repetition of OCD and restricted interests of ASD), reflecting the overlapping features among the investigated psychopatholgical dimensions may further complicate the diagnostic process and the subsequent categorization of participants into groups. Considering the statistical analyses, it should be noted the absence of correction

for multiple comparisons. Furthermore, this is an exploratory study and information about clinical features (es. illness duration, age of onset, and specific comorbidities) were not taken into account. This issue may influence the interpretation of our results, so that a cautious interpretation of our findings is needed. Finally, the cross-sectional design of the study did not allow us to evaluate possible temporal or causal relationships between the variables under investigation.

Conclusions

Globally our work highlights that subjects with OCD and clinical SAD symptoms present a higher global severity of OCD symptoms and a higher presence of autistic traits when compared with subjects with OCD without SAD, with a pattern of specific autistic and OCD symptoms which seem to be more pronounced in patients with OCD with SAD. On the other hand, when evaluated with regression analyses, the OCD+SAD phenotype seems to be more strongly associated with autism spectrum than with OCD severity in this specific sample and as measured by the used psychometric questionnaires, further confirming the link between autism spectrum and SAD reported in the scientific literature [10,11,26-27].

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Conflict of interest statement

The authors declare no conflicts of interests.

Author contributions

LDO, BC, SP: conceptualization; BC, SP, GM: methodology; GM, BC: formal analysis; BC, CB, BN, FG, FP, CP, CR: investigation; LDO, BC: resources; BN, BC, CB, FP, FG, CP: writing – original draft preparation; BC, CB: writing – review and editing; LDO, SP, IMC, BC: supervision. All authors have read and agreed to the submitted version of the manuscript.

Ethical consideration

The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the Azienda Ospedaliero-Universitaria of Pisa. Written informed consent was obtained from all subjects involved in the study.

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