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The Obsessive-Compulsive Inventory-Revised (OCI-R): Translation and Validation of the European Portuguese Version

Obsessive-Compulsive Inventory-Revised (OCI-R): Tradução e Validação da Versão Portuguesa

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ABSTRACT

Introduction: The Obsessive-Compulsive Inventory-Revised has been developed to evaluate the severity of obsessive-compulsive symptoms in both clinical and non-clinical individuals. The aim of this study was to evaluate the psychometric properties of the Portuguese version.

Material and Methods: This questionnaire was applied to 90 people with obsessive-compulsive disorder and 246 without a known mental illness. In addition to this clinical evaluation instrument, participants completed other clinical assessment scales that helped characterize the two study groups.

Results: Given the objective of this study, to evaluate the structure by six factors, a confirmatory factor analysis was performed [patient group: $\chi2(120, n = 90) = 205.779$, $p < 0.01$; CFI = 0.916; GFI = 0.814; RMSEA = 0.0890. Control group: $\chi2(120, n = 246) = 224.762$, $p < 0.01$; CFI = 0.938; GFI = 0.904; RMSEA = 0.060]. To assess the internal consistency of the scale, Cronbach's alpha was determined (patient group: α = 0.913; control group: α = 0.888). Convergent validity was tested by determining the Spearman correlation between the scores obtained in the Obsessive-Compulsive Inventory-Revised and Y-BOCS in the patient group (r = 0.651; $p < 0.01$).

Conclusion: Obsessive-Compulsive Inventory-Revised has proved to be a consistent, valid, and reliable instrument with good psychometric properties to determine the severity of obsessive-compulsive symptoms in the Portuguese population.

Keywords: Obsessive-Compulsive Disorder; Portugal; Psychiatric Status Rating Scales; Psychometrics; Reproducibility of Results; Translating

RESUMO

Introdução: A escala *Obsessive-Compulsive Inventory-Revised* foi desenvolvida para avaliar a gravidade dos sintomas obsessivo-compulsivos em contexto clínico e não clínico. O objectivo deste estudo foi avaliar as propriedades psicométricas da sua versão portuguesa.

Material e Métodos: O questionário em estudo foi aplicado a 90 pessoas com perturbação obsessivo-compulsiva e 246 pessoas sem doença psiquiátrica conhecida. Além deste instrumento de avaliação clínica, os participantes preencheram outras escalas de avaliação clínica que ajudaram a caracterizar os dois grupos de estudo.

Resultados: Dado o objetivo deste estudo, para avaliar a estrutura por seis fatores foi realizada uma análise fatorial confirmatória [grupo de doentes: $\chi2(120, n = 90) = 205,779$, $p < 0.01$; CFI = 0,916; GFI = 0,814; RMSEA = 0,0890. Grupo controlo: $\chi2(120, n = 246) = 224,762$, $p < 0,01$; CFI = 0,938; GFI = 0,904; RMSEA = 0,060]. Para avaliar a consistência interna da escala foi determinado o *alpha* de Cronbach (grupo de doentes: α = 0,913. grupo controlo: α = 0,888). A validade convergente foi testada através da determinação da correlação de Spearman entre as pontuações obtidas no *Obsessive-Compulsive Inventory-Revised* e Y-BOCS no grupo de doentes (r = 0,651; $p < 0,01$).

Conclusão: O *Obsessive-Compulsive Inventory-Revised* revelou-se um instrumento consistente, válido e fiável com boas propriedades psicométricas para determinar a gravidade dos sintomas obsessivo-compulsivos na população portuguesa.

Palavras-chave: Escalas de Graduação Psiquiátrica; Perturbação Obsessivo-Compulsiva; Portugal; Psicometria; Reprodutibilidade dos Testes; Tradução

INTRODUCTION

Obsessive-compulsive disorder (OCD) is a condition that has a worldwide estimated 12-month prevalence between 1.1% and 1.8%[1] and an estimated lifetime prevalence of 2.3%.[2] In Portugal, the 12-month prevalence is estimated at 4.4% and the lifetime prevalence at 5.3%.[3]

OCD is associated with high levels of anxiety and suffering[4,5] and, as the name suggests, is characterized by the presence of obsessions, which are recurrent thoughts, impulses, or images experienced as intrusive and unwanted that usually trigger compulsions that are repetitive behaviors or mental acts that an individual feels compelled to perform according to strict rules that they set.[1]

Although established as a single condition, OCD has significant heterogeneity concerning the spectrum of symptoms experienced by patients, making the diagnosis and the follow-up and treatment of patients with this disorder challenging.[6-8] Therefore, over time, several studies have been conducted in order to develop tools that facilitate the task of clinicians and enable them to gather as much pertinent information as possible about the disorder. Examples of this are psychometric rating scales such as the Obsessive-Compulsive Inventory (OCI)[9] and its shortened version

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Obsessive-Compulsive Inventory-Revised (OCI-R),[10] the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS),[11,12] the Padua Inventory[13] or the Clark-Beck Obsessive-Compulsive Inventory.[14]

The OCI is one of the most recent assessment tools and was created to address the instrument's failures that preceded it. Consisting of 42 items, this self-applied instrument has good internal consistency, reliability, and validity, fulfilling its task concerning disorder assessment.[9]

The OCI is considered a substantial advance over other instruments within the different existing scales, given its characteristics. However, the OCI has some limitations, such as its extension, making the response rate to this instrument low. In this sense some changes and improvements were suggested to optimize its use.[9,10] Therefore, the OCI-R assumes itself as a simplified and improved version of the OCI, meeting the same assumptions as the original scale.

The OCI-R consists of 18 equally divided items in six categories: Hoarding, Checking, Ordering, Neutralizing, Washing, and Obsessing. Several studies have tested this scale to evaluate its psychometric properties, and the results obtained were consistent and demonstrated similar values to those obtained for OCI.[10,15-17]

Considering the good psychometric properties, similar to those of OCI, and given the small number of items, the OCI-R is an instrument with remarkable clinical applicability. Therefore, this instrument was translated into different languages, and all different versions were subsequently validated. Also noteworthy is the transversality in the psychometric properties that corroborate the values initially pointed in the development and validation of this instrument.[18-27]

Looking at the national scenario, psychometric properties of OCI-R have been described in two non-clinical samples,[28] but a Portuguese version of this scale duly validated in a clinical population does not exist. For this reason, the aim of this study was to address that gap and assess the psychometric properties of the Portuguese version of the scale in a clinical sample with OCD patients and a non-clinical sample with healthy controls.

MATERIAL AND METHODS

Population and sample

This study was conducted using two groups, one with patients with OCD and another group with individuals without the disorder. The minimum sample size per group was estimated based on the number of OCI-R items: five participants per item, totaling 90 participants.[29,30]

Clinical sample

The clinical sample included patients diagnosed with OCD according to the diagnostic criteria established in DSM-5. Ninety OCD patients (46 women and 44 men) were recruited from the Psychiatry outpatient clinic of Hospital de Braga (Portugal) by their psychiatrists. All participants were aged 18 years or older and voluntarily agreed to participate in this study. Failure to complete at least one of the assessment instruments applied constituted an exclusion factor.

The age of the participants varied between 18 and 67 [mean (M) = 32.64; standard deviation (SD) = 11.40] years and their years of education ranged between four and 19 (M = 12.18; SD = 3.03).

Within the patient group, women had a mean age of 35.30 (SD = 13.05; Min = 18; Max = 67) years, while the average age of men was 29.86 (SD = 8.66; Min = 18; Max = 50) years. Overall, women with the disorder were significantly older than men (independent samples *t*-test $t(88) = -2.34$; $p = 0.02$; Cohen's effect size $d = -0.49$). The group of women had an average schooling of 11.89 (SD = 3.29; Min = 4; Max = 18) years, and men had an average schooling of 12.48 (SD = 2.73; Min = 6; Max = 19) years. Regarding education, there were no significant sex differences.

For these individuals, data were collected using different psychometric assessment scales after consultation. The remaining data, when not obtained from the participants, were collected from their clinical records.

Non-clinical sample

The non-clinical sample (control group) included persons without a known history of mental disorders and aged 18 years and older who voluntarily answered a set of online questionnaires. Therefore, a history of mental illness or addictive behaviors were considered exclusion criteria. Failure to complete at least one of the assessment instruments applied constituted an exclusion factor.

The non-clinical group consisted of 246 people, 168 women and 78 men. Their age ranged between 18 and 60 years (M = 29.32; SD = 8.39), and education varied between nine and 25 years (M = 16.28; SD = 2.70).

Within the control group, women had an average age of 28.47 (SD = 8.28; Min = 18; Max = 57) years and men an average age of 31.12 (SD = 8.38; Min = 19; Max = 60) years. From the age comparison between groups, men were significantly older than women [$t(244) = 2.32$; $p = 0.02$; $d = 0.32$]. The group of women had an average schooling of 15.93 (SD = 2.50; Min = 12; Max = 25) years and men an average of 17.03 (SD = 2.98; Min = 9; Max = 25) years of learning. There were significant differences between women and men in terms of education, with men having more years of education than women [$t(244) = 1.31$; $p < 0.01$; $d = 0.18$].

All data were collected through a Google Forms (Google®, USA) questionnaire sent via email to all students, teachers, and non-teachers at the University of Minho.

Ethical considerations

The OCD patients gave written informed consent while the control participants provided online informed consent before participating in the study. The study was performed following the Declaration of Helsinki and was approved by the Ethics Subcommittee for the Life and Health Sciences of the University of Minho, Portugal (CEICVS 064/2019), and by the Ethics Committee of Hospital de Braga, Portugal (CESHB 138_2019).

Measures

This project required the application of different psychometric assessment instruments. The individuals belonging to the clinical sample were assessed with the OCI-R and Y-BOCS. In the non-clinical sample, only the OCI-R was applied.

The OCI-R is a self-administered questionnaire consisting of 18 items equally divided into six categories/factors: Hoarding, Checking, Ordering, Neutralizing, Washing, and Obsessing. It is a Likert-scale instrument with answers given on a scale between 0 (not at all) and 4 (extremely). The total score ranges from 0 to 72, and the total score for each subscale ranges from 0 to 12.

Considering its characteristics, it allows the determination of the symptoms that most affect the patient and, by adding the scores obtained in all items, assess the severity of the disorder. The higher the score, the more severe the symptoms are.

The original English version of the OCI-R was obtained from Dr. Edna Foa and translated into Portuguese. Subsequently, an independent bilingual translator back-translated the scale, which was sent for approval by the original authors, thus making the Portuguese version of the OCI-R available for application in the populations under study.

The Y-BOCS is a questionnaire applied by a trained healthcare professional. The Y-BOCS consists of 10 Likert-scale questions in which the answers are given on a scale between 0 and 4. The 10 items are divided into two groups of five questions: the obsessions and the compulsions subscales. The total score ranges from 0 to 40, and the total score of each subscale ranges from 0 to 20. The total score obtained allows us to determine the disorder's presence and severity, and the subscales scores enable us to evaluate the type of symptoms that affect patients the most, namely obsessions or compulsions.

Statistical analysis

Both groups were characterized concerning the different variables under study.

Continuous variables with normal distribution were characterized by mean (M) and standard deviation (SD); when this was not the case, the median (Mdn) and interquartile range (IQR) were used.

A comparison between groups for continuous variables was performed using the *t*-test for independent samples, and the effect size measurement was calculated using Cohen's *d* value.[31] When normal distribution was not followed, the comparison between groups was performed using the Mann-Whitney test, and the effect size measurement was calculated using the value of *r*.[31,32]

A confirmatory factor analysis was performed to confirm the factor structure proposed by the original version of the OCI-R. Thus, for both groups, chi-square (χ^2), confirmatory factor index (CFI), goodness of fit index (GFI), and root mean square error of approximation (RMSE) were determined.[33,34]

To evaluate the scale's internal consistency, Cronbach's alpha (α) was determined among the items that constitute the OCI-R.[35,36] This same indicator was determined for each of the six-factors considered. We also assessed the correlation between the six-factors and the total OCI-R score to understand how they relate to each other and the scale globally. In this sense, the Spearman Correlation Coefficient (*r*) was determined.[37]

To assess the convergent validity in the patient group, the correlation between the total score obtained in the instrument under validation and the total score obtained in the Y-BOCS was determined using the Spearman Correlation Coefficient (*r*). In parallel, the OCI-R items were divided into two groups, the obsessions group and compulsions group, and the Spearman Correlation Coefficient (*r*) was determined between the obtained scores and the Y-BOCS equivalent.[37]

Statistical significance was assumed in all tests for *p* values under 0.05. Statistical analysis was performed using IBM® SPSS® Statistics 26 (IBM®, USA) and Microsoft Office Excel 2017 (Microsoft®, USA) software.

RESULTS

Comparison between groups

No participants were excluded during the data analysis. The total OCI-R score was calculated for each individual belonging to the OCD and control groups. As the score obtained in the patient group did not follow a normal distribution, the comparison between groups was performed using the Mann-Whitney test. Significant differences between groups were observed, with patients scoring significantly higher ($U = 5892.50$; $p < 0.01$; effect size $r = 0.36$). The same was true for the comparison of scores between genders (Table 1).

When comparing individuals with the disorder and individuals without the disorder for the scores obtained for each of the six factors that constitute the OCI-R, the OCD subjects scored significantly higher than control subjects,

Table 1 – Comparison between study groups for the total scores obtained in OCI-R

Variable	Group	Median (IQR)	Mann-Whitney test	Effect size
OCI-R total	OCD (n = 90)	30.5 (23.2)	U = 5892.50, p < 0.01*	r = 0.36
	Control (n = 246)	15.0 (16.0)		
	OCD women (n = 46)	35.5 (24.2)	U = 1826.00, p < 0.01*	r = 0.37
	Control women (n = 168)	14.0 (14.2)		
	OCD men (n = 44)	28.5 (20.2)	U = 1006.50 p < 0.01*	r = 0.34
	Control men (n = 78)	18.0 (17.0)		

OCI-R: Obsessive-Compulsive Inventory-Revised; OCD: obsessive-compulsive disorder; n: number of individuals; SD: standard deviation; IQR: iInterquartile range: *U*: calculated value for Mann-Whitney test; *p*: significance probability; *r*: effect size value.
*: p < 0.05, two-tailed.

except for the Hoarding factor, in which no significant differences were observed between groups (Table 2). When comparing the scores obtained for each sex subgroup between OCD and the control group, we concluded that both women and men with OCD had significantly higher scores than women and men without the disorder, except for the Hoarding factor in men and women and the Ordering factor in men (Table 2).

Factor structure

Considering, *a priori*, that the Portuguese version of the OCI-R follows the six-factor structure established by the original version of this instrument, confirmatory factor analysis was performed separately with the data from OCD patients and individuals belonging to the non-clinical group.

In general, it can be said that the results obtained are not entirely favorable for admitting that the OCI-R imperatively follows the originally established 6-factor structure. However, the excellent results obtained at the CFI and GFI levels should be highlighted in both groups [for the patient group $\chi2(120, n = 90) = 205.779$, $p < 0.01$; CFI = 0.916; GFI = 0.814; RMSEA = 0.0890; for the control group: $\chi2(120, n = 246) = 224.762$, $p < 0.01$; CFI = 0.938; GFI = 0.904; RMSEA = 0.060.]

Internal consistency

For both groups under study, the Cronbach's alpha (α) value was calculated for the full scale and the different subscales that constitute it, according to the six-factors (Table 3).

The α value recorded in the patient group for the full scale was considered extremely high (α = 0.913), suggesting an excellent internal consistency of the scale. The α values for the different subscales showed an internal consistency from acceptable to good (α 0.783 - 0.876).

For the control group, the α value for the OCI-R was considered good (α = 0.888), reflecting a good internal consistency of the scale. The α values for the different factors suggested an acceptable to good internal consistency (α 0.713 - 0.817), except for the Neutralizing factor, which had a questionable internal consistency (α = 0.692).

At the same time, the correlation between the OCI-R and the different subscales that constitute it, as well as among the different subscales, was evaluated by determining the Spearman's Correlation Coefficient. As shown in Table 4, in the patients' group, the correlation between the total OCI-R score and its subscales was strong (r 0.658 - 0.794; p < 0.01), and among the different subscales, the correlation was considered weak to moderate. These findings suggest that, globally, the different subscales had a good correlation with the OCI-R total score and, although related, the information collected by each of them was not redundant. In the control group, the correlation between the total OCI-R score and its subscales was strong (r 0.630 - 0.796; p < 0,01) and, among the different subscales, the correlation was considered weak to moderate.

Convergent validity

To assess the convergent validity, Spearman's Correlation was performed between the scores obtained in the OCI-R and Y-BOCS within the patient group. Considering that Y-BOCS evaluates two OCD dimensions, obsessions and compulsions, the items that constitute the OCI-R were divided into two groups: the obsessions group and the compulsions group. The Spearman's Correlation was evaluated between these groups and the equivalents outlined in the Y-BOCS. The correlation between Y-BOCS and OCI-R total scores was strong (r = 0.651; p < 0.01) and, among the dimensions of these previously considered instruments, the correlation was strong for compulsions (r = 0.642; p < 0.01) and moderate for obsessions (r = 0.513; p < 0.01).

DISCUSSION

The present study evaluated the psychometric properties of the Portuguese version of the OCI-R in two samples: a clinical sample of people with OCD and a non-clinical sample of persons without the disorder. The evaluation of these properties aimed to validate this version of the instrument.

Having used two different samples, we proceeded to

Table 2 – Comparison between study groups for the scores obtained for the OCI-R factors

Variable	Group	Mean ± SD	*t*-test	Effect size
Hoarding	OCD (n = 90)	3.40 ± 3.26	*t*(334) = -0.40, *p* = 0.69	*d* < 0.01
	Control (n = 246)	3.54 ± 2.86		
	OCD women (n = 46)	3.13 ± 3.07	*t*(212) = -1.00, *p* = 0.316	*d* = 0.01
	Control women (n = 168)	3.63 ± 2.98		
	OCD men (n = 44)	3.68 ± 3.44	*t*(120) = 0.54, *p* = 0.59	*d* = 0.01
	Control men (n = 78)	3.36 ± 2.58		
Checking	OCD (n = 90)	5.40 ± 3.85	*t*(334) = 7.47, *p* < 0.01*	*d* = 0.08
	Control (n = 246)	2.78 ± 2.45		
	OCD women (n = 46)	5.72 ± 3.94	*t*(212) = 5.09, *p* < 0.01*	*d* = 0.10
	Control women (n = 168)	2.62 ± 2.34		
	OCD men (n = 44)	5.16 ± 3.78	*t*(120) = 3.14, *p* < 0.01*	*d* = 0.06
	Control men (n = 78)	3.14 ± 2.64		
Ordering	OCD (n = 90)	5.62 ± 3.87	*t*(334) = 2.55 *p* < 0.01*	*d* = 0.03
	Control (n = 246)	4.59 ± 3.05		
	OCD women (n = 46)	5.98 ± 3.93	*t*(212) = 2.18, *p* = 0.03*	*d* = 0.04
	Control women (n = 168)	4.61 ± 3.10		
	OCD men (n = 44)	5.25 ± 3.82	*t*(120) = 1.07, *p* = 0.29	*d* = 0.02
	Control men (n = 78)	4.54 ± 2.98		
Neutralizing	OCD (n = 90)	3.62 ± 3.53	*t*(334) = 5.12, *p* < 0.01*	*d* = 0.14
	Control (n = 246)	1.59 ± 2.13		
	OCD women (n = 46)	3.91 ± 3.29	*t*(212) = 4.50, *p* < 0.01*	*d* = 0.08
	Control women (n = 168)	1.60 ± 2.19		
	OCD men (n = 44)	3.32 ± 3.78	*t*(120) = 2.84, *p* < 0.01*	*d* = 0.06
	Control men (n = 78)	1.58 ± 2.02		
Washing	OCD (n = 90)	4.89 ± 3.97	*t*(334) = 7.51, *p* < 0.01*	*d* = 0.10
	Control (n = 246)	1.57 ± 2.20		
	OCD women (n = 46)	5.24 ± 4.34	*t*(212) = 5.70, *p* < 0.01*	*d* = 0.11
	Control women (n = 168)	1.48 ± 2.07		
	OCD men (n = 44)	4.52 ± 3.55	*t*(120) = 4.54, *p* < 0.01*	*d* = 0.09
	Control men (n = 78)	1.78 ± 2.46		
Obsessing	OCD (n = 90)	6.89 ± 3.70	*t*(334) = 9.02, *p* < 0.01*	*d* = 0.12
	Control (n = 246)	3.04 ± 2.73		
	OCD women (n = 46)	7.09 ± 3.93	*t*(212) = 6.48, *p* < 0.01*	*d* = 0.11
	Control women (n = 168)	3.10 ± 2.71		
	OCD men (n = 44)	6.68 ± 3.47	*t*(120) = 6.15, *p* < 0.01*	*d* = 0.12
	Control men (n = 78)	2.92 ± 2.80		

OCI-R: Obsessive-Compulsive Inventory-Revised; OCD: obsessive-compulsive disorder; n: number of individuals; SD: standard deviation; *t*: calculated value for *t*-test; *p*: significance probability; *d*: Cohen's effect size.
*: *p* < 0.05, two-tailored.

the evaluation and comparison of different factors between them. Additionally, a comparison was also made between the results obtained for the evaluation instruments applied.

When analyzing the results obtained for the assessment instruments applied, the differences between the patient and control groups were evident, as expected and as widely described in the literature. The patient group had higher total scores on the OCI-R and its subscales as expected.[10,15-27] There were no significant differences between men and women, which indirectly indicates that the scale in

Table 3 – Evaluation of OCI-R internal consistency through Cronbach's alpha (α) determination

Variable	**OCD** (n = 90)	**Control** (n = 246)
OCI-R total	α = 0.913	α = 0.888
Hoarding	α = 0.850	α = 0.747
Checking	α = 0.870	α = 0.713
Ordering	α = 0.876	α = 0.817
Neutralizing	α = 0.783	α = 0.692
Washing	α = 0.855	α = 0.770
Obsessing	α = 0.869	α = 0.798

OCI-R: Obsessive-Compulsive Inventory-Revised; OCD: obsessive-compulsive disorder; n: number of individuals.

question has, *a priori*, equal value for both sexes. Also, in the group of patients, it should be noted that the factor with the average minimum score was the Hoarding factor, a finding described in several studies.[10,22,26]

The control group presented global and partial OCI-R scores that are higher than those described in the literature for disorder-free groups.[19,23,24] This can be explained by different factors such as the fact that this group has a high education level or the fact that the information was collected through an online questionnaire, not allowing to identify individuals with undiagnosed disorders. Within this group, there were no differences between men and women, which supports the hypothesis that OCI-R has the same value regardless of sex.

Comparisons between the OCD and control groups showed significant differences for both total and subscales scores. These findings are extremely conjecturable given that the OCI-R is a scale that evaluates obsessive-compulsive symptoms and concurs with results described globally in different manuscripts.[21,22,24-26] It should be noted, however, that for the Hoarding factor, there were no significant differences between groups. This result is most likely related to the fact that this is the factor with the lowest average score in patients, as mentioned above.

Confirmatory factor analysis was performed to assess whether the Portuguese version of the OCI-R follows the six-factor structure proposed when the original version of this instrument was developed. Although it was foreseeable that the Portuguese version would follow this structure, the results obtained discredited this presumption. The results obtained for both samples do not entirely support the structure of the six-factors. However, even if not all requirements

Table 4 – Spearman's correlations among the six OCI-R factors and OCI-R total score for both groups under study

Variable	Hoarding	Checking	Ordering	Neutralizing	Washing	Obsessing
OCD (n = 90)						
Checking	r = 0.327, p < 0.01*					
Ordering	r = 0.550, p < 0.01*	r = 0.582, p < 0.01*				
Neutralizing	r = 0.429, p < 0.01*	r = 0.465, p < 0.01*	r = 0.553, p < 0.01*			
Washing	r = 0.294, p < 0.01*	r = 0.351, p < 0.01*	r = 0.400, p < 0.01*	r = 0.471, p < 0.01*		
Obsessing	r = 0.464, p < 0.01*	r = 0.344, p < 0.01*	r = 0.358, p < 0.01*	r = 0.544, p < 0.01*	r = 0.380, p < 0.01*	
OCI-R total	r = 0.658, p < 0.01*	r = 0.722, p < 0.01*	r = 0.792, p < 0.01*	r = 0.794, p < 0.01*	r = 0.664, p < 0.01*	r = 0.694, p < 0.01*
Control (n = 246)						
Checking	r = 0.360, p < 0.01*					
Ordering	r = 0.349; p < 0.01*	r = 0.558, p < 0.01*				
Neutralizing	r = 0.380, p < 0.01*	r = 0.480, p < 0.01*	r = 0.500, p < 0.01*			
Washing	r = 0.250, p < 0.01*	r = 0.381, p < 0.01*	r = 0.479, p < 0.01*	r = 0.471, p < 0.01*		
Obsessing	r = 0.334, p < 0.01*	r = 0.367, p < 0.01*	r = 0.429, p < 0.01*	r = 0.458, p < 0.01*	r = 0.367, p < 0.01*	
OCI-R total	r = 0.641, p < 0.01*	r = 0.734, p < 0.01*	r = 0.796, p < 0.01*	r = 0.709, p < 0.01*	r = 0.630, p < 0.01*	r = 0.696, p < 0.01*

OCI-R: Obsessive-Compulsive Inventory-Revised; OCD: obsessive-compulsive disorder; n: number of individuals; *r:* Spearman's correlation coefficient; *p:* significance probability.
*: p < 0.05, two-tailored.

are met, the values obtained were substantially similar to the results presented in the scale creation studies.[10,16,17] On the other hand, although cutoff points were defined for the parameters evaluated in this process, the literature argues that we should not stick to them because different factors can influence the results obtained in confirmatory factor analysis, from the number of individuals that constitute the sample, to the type of distribution that the variables follow, and the type of content the scale evaluates.[31,32] In this way, considering that the results obtained were similar to those obtained in other studies and that the literature advocates a holistic approach to the scale rather than an approach focused on specific parameters evaluated by factor analysis, we assumed that the Portuguese version of OCI-R follows the model of the six-factors.

Regarding internal consistency, the results obtained are in line with the results presented by scale development studies[10,16,17] and presented by translation studies for different languages.[19,21,24-26] Therefore, Cronbach's alpha values demonstrated an excellent internal consistency for the OCI-R as a whole and an acceptable to good internal consistency for the different subscales for patients. This means that, overall, the items constituting the questionnaire strongly support the scale and the different subscales, in the sense that the information collected is strongly related to each other and contributes to the same end.

Concerning internal consistency, the results obtained for the correlation between the different factors and the scale as a whole should be mentioned, as well as between the different factors, which, once again, attests that the content collected presents a consistent and solid basis. These findings are consistent with previously described results.[10,16,17,19-27]

The inferences drawn for the patient group for internal consistency also applied to the control group. However, the values obtained were slightly lower, probably due to the nature of the parameters assessed by the OCI-R.

Considering that the OCI-R is an evaluation instrument whose main objective is to evaluate the disorder in people with OCD, the correlation between the Portuguese version of this instrument and the Y-BOCS was determined. The results show a strong correlation between both psychometric assessment scales allowing us to infer that the OCI-R is a good instrument in the assessment of OCD. The findings are corroborated with results from similar studies.[10,15,24] Notably, the correlation coefficients were slightly higher than those described in the literature, indicating a stronger relationship between these two instruments in the present study. Considering the dimensions of the obsessions and compulsions evaluated by the Y-BOCS, their correlation with the equivalent dimensions for the OCI-R version under study was also assessed. Although no known literature considers this type of assessment, the results concur with the previously inferred insofar as OCI-R and Y-BOCS present a good correlation. However, it should be noted that OCI-R is not a scale that assesses the disorder in the two dimensions considered, which may limit the interpretation of these results.

CONCLUSION

The Portuguese version of OCI-R has overlapping characteristics with the original version of the instrument and other versions duly validated in different languages. In addition to the overlapping results, this version of OCI-R follows the six-factor structure and has excellent internal consistency and good convergent validity. An appropriate cut-off point for the distinction between individuals with and without disorder is left to be determined. Considering that this instrument is meant to be used in clinical practice to measure disorder severity, it is not crucial to determine this cutoff point since applying this scale should happen after adequate clinical evaluation.

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AUTHOR CONTRIBUTIONS

GVC: Data collection and analysis, writing of the manuscript.

PSM: Study design, data collection and analysis, writing of the manuscript.

MMS: Data collection, writing of the manuscript.

TC: Scale translation and validation, data collection, writing of the manuscript.

MPP, SF: Data collection and analysis, writing of the manuscript.

PM: Study design, scale translation and validation, data collection, writing of the manuscript, supervision.

PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in 2013.

DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

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REFERENCES

1. American Psychiatric Association. 5th ed. Diagnostic statistical manual of mental disorders (DSM-5). Virginia: APA; 2013.
2. Stanford Medicine. Obsessive-compulsive and related disorders epidemiology. [cited 2020 Oct 6]. Available from: http://med.stanford.edu/ocd/about/prevalence.html.
3. Caldas De Almeida JM, Xavier M. Estudo epidemiológico nacional de Saúde Mental 1º Relatório. Lisboa: Faculdade de Ciências Médicas, Universidade Nova de Lisboa; 2013.
4. Koran LM, Thienemann ML, Davenport R. Quality of life for patients with obsessive-compulsive disorder. Am J Psychiatry. 1996;153:783–8.
5. Morgado P, Freitas D, Bessa JM, Sousa N, Cerqueira JJ. Perceived stress in obsessive–compulsive disorder is related with obsessive but not compulsive symptoms. Front Psychiatry. 2013;4:1-6.
6. Abramowitz JS, Houts AC. Concepts and controversies in obsessive-compulsive ddisorder. New York: Springer; 2005.
7. Bloch MH, Landeros-Weisenberger A, Rosario MC, Pittenger C, Leckman JF. Meta-analysis of the symptom structure of obsessive-compulsive disorder. Am J Psychiatry. 2008;165:1532–42.
8. Leckman JF, Bloch MH, King RA. Symptom dimensions and subtypes of obsessive-compulsive disorder: a developmental perspective. Dialogues Clin Neurosci. 2009;11:21–33.
9. Foa EB, Kozak MJ, Salkovskis PM, Coles ME, Amir N. The validation of a new obsessive-compulsive disorder scale: the obsessive-compulsive inventory. Psychol Assess. 1998;10:206–14.
10. Foa EB, Huppert JD, Leiberg S, Langner R, Kichic R, Hajcak G, et al. The Obsessive-Compulsive Inventory: development and validation of a short version. Psychol Assess. 2002;14: 485–96.
11. Goodman WK, Price LH, Rasmussen SA, Mazure C, Delgado P, Heninger GR, et al. The Yale-Brown Obsessive Compulsive Scale. II. Validity. JAMA Psychiatry. 1989;46:1012–6.
12. Goodman WK, Price LH, Rasmussen SA, Mazure C, Fleischmann RL, Hill CL, et al. The Yale-Brown Obsessive Compulsive Scale. I. Development, use, and reliability. JAMA Psychiatry. 1989;46:1006–11.
13. Sanavio E. Obsessions and compulsions: The Padua Inventory. Behav Res Ther. 1988;26:169–77.
14. Clark DA, Beck AT, Antony MM, Swinson RP, Steer RA. Screening for obsessive and compulsive symptoms: validation of the Clark-Beck Obsessive-Compulsive Inventory. Psychol Assess. 2005;17:132–43.
15. Abramowitz JS, Deacon BJ. Psychometric properties and construct validity of the Obsessive–Compulsive Inventory-Revised: replication and extension with a clinical sample. J Anxiety Disord. 2006;20:1016–35.
16. Hajcak G, Huppert JD, Simons RF, Foa EB. Psychometric properties of the OCI-R in a college sample. Behav Res Ther. 2004;42:115–23.
17. Huppert JD, Walther MR, Hajcak G, Yadin E, Foa EB, Simpson HB, et al. The OCI-R: validation of the subscales in a clinical sample. J Anxiety Disord. 2007;21:394–406.
18. Aydin A, Boysen M, Kalafat T, Selvi Y, Besiroglu L, Kagan M. Validation of the Turkish version of the obsessive-compulsive ınventory-revised (OCI-R) in clinical and non-clinical samples. Noro Psikiyatr Ars. 2014;51:15–22.
19. Belloch A, Roncero M, García-Soriano G, Carrió C, Cabedo E, Fernández-Álvarez H. The Spanish version of the Obsessive-Compulsive Inventory-Revised (OCI-R): reliability, validity, diagnostic accuracy, and sensitivity to treatment effects in clinical samples. J Obsessive Compuls Relat Disord. 2013;2:249–56.
20. Ghassemzadeh H, Shams G, Abedi J, Karamghadiri N, Ebrahimkhani N, Rajabloo M. Psychometric properties of a Persian-language version of the Obsessive-Compulsive Inventory-Revised: OCI-R-Persian. Psychology. 2011;02:210–15.
21. Gönner S, Leonhart R, Ecker W. The Obsessive-Compulsive Inventory-Revised (OCI-R): validation of the German version in a sample of patients with OCD, anxiety disorders, and depressive disorders. J Anxiety Disord. 2008;22:734–49.
22. Sica C, Ghisi M, Altoè G, Chiri LR, Franceschini S, Coradeschi D, et al. The Italian version of the Obsessive Compulsive Inventory: its psychometric properties on community and clinical samples. J Anxiety Disord. 2009;23:204–11.
23. Smárt J, Ólason DT, Eypórsdóttir Á, Frölunde MB, Smári J, Ólason DT, et al. Psychometric properties of the Obsessive Compulsive Inventory-Revised among Icelandic college students. Scand J Psychol. 2007;48:127–33.
24. Solem S, Hjemdal O, Vogel PA, Stiles TC. A Norwegian version of the Obsessive-Compulsive Inventory-Revised: psychometric properties.

Scand J Psychol. 2010;51:509–16.
25. Souza FP, Foa EB, Meyer E, Niederauer KG, Cordioli AV. Psychometric properties of the Brazilian Portuguese version of the Obsessive-Compulsive Inventory: Revised (OCI-R). Rev Bras Psiquiatr. 2011;33:137–42.
26. Woo CW, Kwon SM, Lim YJ, Shin MS. The Obsessive-Compulsive Inventory-Revised (OCI-R): psychometric properties of the Korean version and the order, gender, and cultural effects. J Behav Ther Exp Psychiatry. 2010;41:220–7.
27. Zermatten A, Van der Linden M, Jermann F, Ceschi G. Validation of a French version of the Obsessive-Compulsive Inventory-Revised in a non-clinical sample. Eur Rev Appl Psychol. 2006;56:151–5.
28. Faria MN, Cardoso I. Propriedades psicométricas da versão portuguesa do Obsessive-Compulsive Inventory – Revised. Análise Psicológica. 2017;1:91-109.
29. Anthoine E, Moret L, Regnault A, Sbille V, Hardouin JB. Sample size used to validate a scale: a review of publications on newly-developed patient reported outcomes measures. Health Qual Life Outcomes. 2014;12:176.
30. Kline P. Psychometrics and psychology. 1st ed. Cambridge-Massachusetts: Academic Press Inc; 1979.
31. Tomczak M, Tomczak E. The need to report effect size estimates revisited. An overview of some recommended measures of effect size. Trends Sport Sci. 2014;1:19–25.
32. Lewsey J. Medical statistics: a guide to data analysis and critical appraisal. Ann R Coll Surg Eng. 2006;88:603.
33. Brown TA. Confirmatory factor analysis for applied research. 2nd ed. New York: The Guilford Press; 2015.
34. Hooper D, Coughlan J, Mullen M. Structural equation modelling: guidelines for determining model. Electron J Bus Res Methods. 2008;6.
35. Cronbach LJ. Coefficient alpha and the internal structure of tests. Psychometrika. 1951;16:297–334.
36. George D, Mallery P. SPSS for Windows step by step: a simple guide and reference. 4th ed. Boston: Allyn and Bacon; 2003.
37. Crawford, E. Statistical education through problem solving. London: Royal Statistical Society; 2004.