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Psychometric properties of Malay obsessive-compulsive inventory-child version (OCI-CV) in Malaysian perspectives

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Abstract

Background: This study aimed to examine the psychometric properties of reliability and validity of OCI-CV in a non-clinical sample of Malaysian children and adolescents.

Method: Participants of school-age and adolescent students from Klang Valley School completed the 21-item Malay OCI-CV using Google Form. OCI-CV English version was translated backward and forward to the Malay language. Face validity was conducted first before distributing the questionnaire to the participants. Exploratory Factor analysis (EFA) and Confirmatory Factor Analysis (CFA) was conducted to evaluate the psychometric properties of OCI-CV.

Results: A total of 102 school-age children and adolescents with a mean age of 15.96 years (male: 41.2%, female: 58.8%) participated in the study. The Malay OCI-CV showed high internal consistency, with Cronbach Alpha values of 0.90 for the whole scale. EFA showed multifactorial components. Five factors were labelled as "Washing / Ordering, Doubting, Obsessions, Checking, and Hoarding,". In the CFA, the five-factor model indicates adequate fit indices of ($\chi 2/df = 1.51$, RMSEA = .071, GFI = .824, AGFI = .769, NFI = .724, CFI = .880).

Conclusion: The Malay OCI-CV has good psychometric properties and is suitable for use in the Malaysian context. Further validation studies should be conducted among a clinical population to enhance the generalization of this finding.

Keywords: Obsessive-compulsive disorder, OCI-CV, child, validation

Introduction

Obsessive-Compulsive Disorder (OCD) is a mental disorder that consists of obsessive thoughts and compulsive behaviours. It is associated with impairments in social and occupational functioning and quality of life (1, 2). In addition, OCD is commonly comorbid with other psychiatric disorders which may hinder effective management (3, 4).

The prevalence rate of OCD is reported between 1% to 3% of children and adolescents internationally (5). In Malaysia, 1% to 2% of the population is affected by OCD, across ethnicity and males and females, including children and young adolescents (6). Although paediatric OCD is prevalent and causes impairment in daily functioning and social relationships, it is frequently misdiagnosed and undertreated, particularly in Malaysia (6). Because of the heterogeneous nature of paediatric OCD, a variety of potential comorbid conditions, and potentially limited, the development of valid

paediatric OCD diagnostic criteria is challenging (7, 8). The availability of well-established instruments for assessing paediatric OCD symptoms is critical for developing and disseminating effective interventions and early detection and treatment initiatives.

A considerable amount of literature has been published on instruments or questionnaires used to assess OCD. The Children's Yale-Brown Obsessive-Compulsive Scale (CY-BOCS) a semi-structured interview has been widely used to measure OCD symptoms and assess the symptoms severity (9, 10). Despite the fact that this clinician rated interviews will accurately diagnosed individuals with OCD, this diagnostic instrument is only available to qualified clinician and requires a lengthy interview (11, 12). Due to the time costs of administering clinician-rated measures in research and clinical practice, several OCD self-report measures have been developed, such as the Children's Florida Obsessive-Compulsive Inventory (C-FOCI) (13), the Leyton Obsessional Inventory Child-Version, (LOI-CV; (14) and the Obsessive-Compulsive Inventory – Child Version (OCI-CV)(15). C-FOCI and LOI-CV self-report provides a fast assessment of both the presence and severity of OCD symptoms, it does not evaluate the severity of individual symptoms (16) and insensitivity to treatment changes (17, 18). Compared to other self-reports, OCI-CV is a well-established self-report measure that assesses the frequency and distress related to OCD based on dimensionality (19). This questionnaire is a shorter version of a self-instrument (21-items) developed for children and adolescents from the adult version of the OCI (42-items) inventory and is sensitive to treatment changes (18).

Both OCI-CV and OCI-R (Obsessive Compulsive Inventory-Revised) has been widely used to assess children and adults with OCD and has excellent psychometric qualities (15, 20). OCI-CV has 21 items and six domains: Doubting/Checking, Obsessing, Washing, Hoarding, Ordering, and Neutralizing. It is suitable for children aged 7 to 17, with strong internal consistency with Cronbach's .81 for the total and subscales (15). The overall test-retest reliability coefficient was .77, with subscales ranging from .68 to .85. This result of good psychometric of OCI-CV was supported by other findings using clinical samples of children and adolescents (19, 21) and non-clinical samples of children and adolescents (19, 22-24). A recent OCI-CV revised study was conducted where researchers omitted hoarding items and conducted a survey using 18 items. They found that OCI-CV revised showed a five factor model and good convergent and discriminant validity (9).

Due to the high usability of OCI-CV in screening for OCD, as well as sensitivity to treatment changes, this tool has been widely translated and validated. For example, the OCI-CV has been tested on clinical and non-clinical samples in Spain (23), Italy (22), Chile (19), Sweden (21), Nigeria (25) and Iran (19). All of these studies findings showed comparable results and confirmed the instrument's compatibility with non-Western cultures, as well as demonstrating it to be a valid and reliable technique to assess paediatric OCD.

The OCI-CV has not been validated for use in Malaysia. Therefore, the purpose of this study was to determine the psychometric properties of the Malay OCI-CV in healthy adolescents. Since Malaysia is a multicultural country (26), it is critical to use OCI-CV that has been modified and adapted to various populations to avoid assumptions based on race, ethnicity, and culture (27) and aid in the distribution of evidence-based assessment methods (23).

Method

Participants

The sample included 102 children and adolescents ranging in age from 10 to 18 years old recruited from a private school in Klang Valley, in Kuala Lumpur, Malaysia. Participants were randomly chosen from Year 7 to Year 11 students based on a stratified sampling of their academic years. Inclusion criteria for the groups included the following: (a) being between the ages of 10 and 18 years old; (b) able to read and understand the Malay language. After receiving information about the study through Google Forms, due to the nature of this study requiring underage participants, parental consent was requested in the form. Parents were given a password to access the questionnaire. This was to ensure that underage participants were given consent from their parents to participate in the study. The participants completed socio-demographic questions and the Malay OCI-CV. They were informed that they are allowed to clarify any questions related to the sociodemographic with their parents to ensure correct responses. This study was approved by Universiti Kebangsaan Malaysia (UKM) Medical Research and Ethics Committee (Research Code: JEP- 2021-206).

Instruments

Socio-Demographics

The self-generated questions included age, sex (male/female), religion (Islam, Buddhism, Hinduism, Christianity, and others), ethnicity (Malay, Chinese, and Indian), family economic status (B40: Below 40, M40: Middle 40, and T20: Top 20 group), educational background including UPSR (Primary School Assessment Test), PT3 (Form Three Assessment), and SPM (Malaysian Certificate of

Education for Secondary), and history of mental illness.

Obsessive-Compulsive Inventory: Child Version (OCI-CV)
The Obsessive-Compulsive Inventory-Child Version (OCI-CV) is a 21-item self-report inventory used to assess OCD dimensional and symptoms in children and adolescents aged 7 to 17 years. Foa et al. (2010) created it with a 3-point Likert type scale, scored 0 to 2 (0=Never, 1=Sometimes, and 2=Always), with 42 as the highest score.

The instrument was translated and converted to the Malay language after receiving permission from the creator. To ensure neutrality, the translation from English to the Malay language was done by two Master psychology students who had never seen the original scales, and verified by the principal researcher and creator before being back-translated to English. The back translations by two other Master psychology students were then again evaluated and integrated, yielding an initial Malay version of each scale. Before distributing the final Malay OCI-CV to a larger study, the OCI-CV was pilot tested for face validity among 30 students and Cronbach alpha of 0.90 with the baseline for each item.

Statistical Analysis

The data were examined for distribution and found to be normally distributed. Statistical analysis was performed using Statistical Package for Social Science (SPSS) version 26 for Windows (28). The frequency (n) and percentage (%) of categorical data were used to describe them. To describe normally distributed data, mean and standard deviation (SD) were utilised. The structural validity was examined using Exploratory Factor Examination (EFA). EFA is used to demonstrate the construct validity of self-reporting scales as well as a method for condensing a high number of variables into a smaller number (29, 30). The interpretation of these components was further explained through Varimax rotation. Varimax adjustment or rotation is a statistical process used to maximize the data variance of squared loading shared among the items, producing higher factor loadings for a small number of variables, while the rest will be low factor loadings (31). EFA with Orthogonal (varimax) rotation was used for validity analysis. The Kaiser–Meyer–Olkin (KMO) test and Bartlett's test of sphericity were used to identify the number of dimensions to extract, while the Kaiser rule (Eigenvalue>1.0) was used to determine sample adequacy (32). The correlation between OCI-CV items was investigated using Pearson correlation. Internal consistency was assessed using Cronbach alpha to measure the degree to which items are interrelated in the scale (33). The alpha value is very much influenced by the number of items presented on the scale. A high alpha value between 0 to 1 indicates a high interrelated value, whilst 0.49 to 0.75 is considerably good. The threshold for statistical significance was established at $p = 0.05$.

In addition to EFA, Confirmatory Factor Analysis (CFA) was also calculated using Structural Equational Modelling (SEM) in IBM SPSS AMOS(28). CFA aimed to verify or confirm the factor model and it is inter-correlated with the observed variables. To establish model fit, Chi-square Index ($\chi 2$) values with five other measures of goodness-of it were looked to assess the CFA model. The five measures of goodness of it were including (1) the root mean square error of approximation (RMSEA), (2) goodness-of-fit index (GFI), (3) adjusted GFI (AGFI), (4) normed fit index (NFI), and (5) comparative fit index (CFI) (34).

Results

Socio-Demographic and Study Measures

A total of 102 respondents participated in the study to validate the instrument of OCI-CV. Table 1 shows that the mean age of students participating in the study was 15.96 years old (SD= 1.54). The sample was 58.8% female, and 42.2% of the samples belonged to the Year 9 school students. The mean score of the OCI-CV and its five components were within normal range (Table 1).

TABLE 1. Socio-demographic and study measures

	Mean (SD)	*Frequency (%)*
Gender		
Male		42 (41.2%)
Female		60 (58.8%)
Age (in years) [range 12-19]	15.96 (1.54)	
Family Economical Status		
Below 40 (B40)		21 (20.6%)
Middle 40 (M40)		40 (39.2%)
Top 20 (T20)		41 (40.2%)
Education level		
Year 6 (primary)		20 (19.6%)
Year 7-9 (secondary)		43 (42.2%)
Year 10-11 (secondary)		39 (38.2%)
Ethnicity		
Malay	1.0 (0.1)	102 (100%)
Religion		
Islam	1.0 (0.1)	102 (100%)
Family history of mental illness		
No		88 (86.3%)
Yes		14 (13.7%)
OCI-CV Total Score	16.96 (8.65)	
Ordering / Washing	4.75 (3.13)	
Doubting	5.52 (2.91)	
Obsession	2.7 (1.86)	
Checking	1.7 (1.45)	
Hoarding	2.33 (1.81)	

Household monthly income based on income group. B40: Below RM4,849 (Below US$ 1055); M40: RM4,850 – RM10,959 (US$1056 – US$2385); T20: RM10,960 and above (above US$2386). (35)

Reliability

Based on analysis using Omega macro (36) revealed that the OCI-CV total score has strong internal consistency (21 items: α=0.90). The mean, standard deviation and estimated loading were shown in Table 2.

TABLE 2. Malay OCI-CV Means, Standard Deviation, and Estimated Loading

Items	*Means*	*SD*	*Est. Loading*
OCI-CV 1	0.87	0.66	0.40
OCI-CV 2	0.82	0.64	0.24
OCI-CV 3	0.48	0.70	0.40
OCI-CV 4	1.15	0.62	0.39
OCI-CV 5	1.10	0.72	0.40
OCI-CV 6	0.71	0.71	0.40
OCI-CV 7	0.75	0.73	0.40
OCI-CV 8	0.86	0.81	0.45
OCI-CV 9	0.49	0.63	0.39
OCI-CV 10	0.74	0.69	0.44
OCI-CV 11	1.06	0.77	0.50
OCI-CV 12	0.47	0.59	0.25
OCI-CV 13	0.99	0.69	0.42
OCI-CV 14	1.04	0.78	0.46
OCI-CV 15	0.50	0.64	0.28
OCI-CV 16	1.10	0.78	0.51
OCI-CV 17	0.93	0.76	0.32
OCI-CV 18	0.59	0.75	0.44
OCI-CV 19	0.78	0.76	0.39
OCI-CV 20	0.91	0.68	0.43
OCI-CV 21	0.62	0.73	0.30

Factor Analysis of the OCI-CV

Based Kaiser-Meyer-Olkin measure, sampling adequacy was 0.85 within the recommended value of .9 (31). Barlett's test of sphericity was statistically significant at χ 2 (210): 874.36, p: = 0.001. The first analysis, based on EFA analysis, showed a six-factor model as shown in Table 4, which is dissimilar to the original English OCI-CV (Table3); however, this model has a relatively poor fit in Confirmatory Analysis (CFA). EFA analyses using SPSS (28) were again adjusted to show a five-factor model under OCI-CV and confirmed with parallel analysis (37, 38). Cronbach Alpha for EFA (28) for each factor was 0.81 for factor 1 (Ordering and Washing), 0.82 for factor 2 (Doubting), 0.74 for factor 3 (Obsessing), 0.60 for factor 4 (Checking), and 0.76 for factor 5 (Hoarding). The corrected item for correlations value for each item in the subscales is presented in Table 4 and ranges from 0.41 to 0.63.

A pictorial depiction of the confirmatory factor analysis on the OCI-CV Malay version is presented in Fig.1. As indicated that the best-fit indices have shown that the χ2 test suggested a significant difference result of the CFA [χ2 (160) = 242.29, p=0.001]. The other optional fit indices show adequate properties from the CFA results (RMSEA = .071, GFI = .824, AGFI = .769, NFI = .724, CFI = .880). All of these indices suggested an acceptable fit for the model, and thus confirmed the five-factor structure (34).

Discussion

The main objective of this study was to examine the psychometric properties of the OCI-CV by applying it to a community sample of Malaysian children and adolescents from age 10 to 18 years old. The study found that Malay OCI-CV has multidimensional components, good internal consistency, and high reliability. These results are consistent with those of other studies that report that OCI-CV is a valid instrument for assessing OCD symptoms among children and adolescent populations (17, 18). Despite Malay OCI-CV demonstrating an appropriate level of internal consistency, factor structure and allocation of items for the domain are distinct from the English and other language versions. Based on the exploratory factor analysis finding with 21 items, we found that OCI-CV has five dimensions factors, namely, Ordering and Washing, Doubting, Obsessing, Checking, and Hoarding with neutralizing factor omitted. Contrary to expectations this finding did not derive a similar result with the original finding where they find a six-factor model presented by Foa et al. (2010). Surprisingly, we also found that items for each domain are not in a similar position with the original finding (15). Items 7, 3, and 16 indicating that Hoarding symptoms were retained in our sample. Items in the Neutralizing factor (items 6, 9, and 12) were grouped into checking as well as doubting domain, lowering the dimensions in the Malay version of the OCI-CV from six to five. These findings may be explained in part by respondents' perceptions of neutralising strategies (counting and repetition) as a behavioural response to verifying (checking) or doubting. The items from the original washing domain were grouped in the Ordering factor, therefore we have renamed it the Ordering/Washing domain. This result, may be related to the cultural implications of disclosing OCD symptoms (39) in the Malaysian population. Perhaps, from a Malaysian perspective, their insight into the questions assigned in the OCI-CV differs from the Western context and understanding of the questions (40, 41). Items in the Ordering domain were combined with compulsive cleaning behaviour, indicating symptoms of an individual who engaged in repetitive arranging and rearranging items until conditions of "feels right" were obtained. Another possible explanation for this due to Islamic and society influence, which values “purity” and specific orders for cleaning in general day to day life and to ensure prayers would be accepted by God and eliminated from sickness (39, 42). In a study by Cougle et al. (2012), which examined relationship between guilt and compulsive washing they found

TABLE 3. Six Factor Structure of Original English OCI-CV

English OCI-CV	Factor					
	1	2	3	4	5	6
Subscale 1: Doubting						
4. I check many things over and over again.	0.68					
5. After I have done things, I'm not sure if I really did them.	0.78					
13. Even after I'm done, I still worry that I didn't finish things.	0.70					
20. Even when I do something very carefully, I don't think I did it right.	0.47					
Subscale 2: Neutralizing						
6. I need to count while I do things.		0.73				
12. I have to say some numbers over and over.		0.71				
9. I get behind in my school-work because I repeat things over and over again		0.62				
15. I check doors, windows, and drawers over and over again.		0.53				
Subscale 3: Washing						
21. I wash my hands more than other kids.			0.71			
2. I feel like I must wash and clean over and over again.			0.70			
10. I worry a lot about things being clean.			0.56			
19. I need things to be in a certain way.			0.47			
Subscale 4: Obsessing						
14. I get upset by bad thoughts that pop into my head when I don't want them to.				0.81		
11. I'm upset by bad thoughts.				0.78		
1. I think about bad things and can't stop.				0.50		
Subscale 5: Hoarding						
7. I collect things I don't really need.					0.80	
3. I collect so much stuff that it gets in the way.					0.75	
16. I don't throw things away because I'm afraid I might need them later.					0.55	
Subscale 6: Ordering						
17. I get upset if people change the way I arrange things.						0.73
8. I get upset if my stuff is not in the right order.						0.73
18. If a bad thought comes into my head, I need to say certain things over and over.						0.48

that, guilt increased if an individual did not follow certain washing or ordering criteria (43).

Factor 3 was similarly loaded with Obsessions items as in the original study, except for Item 1, which was grouped with the Doubting factor. This factor indicated that an individual has recurring or repeated intrusive thoughts, impulsive behaviours, or visuals that elicit distressing emotions, such as revulsion. While the hoarding items in factor 5 were the same as those created in the original study, data analysis revealed that factor 4 items included checking symptoms, which define a person who engages in repetitive checking-based obsessive behaviour out of dread that something awful may happen (items 6, 12, and 15). Furthermore, to gain perfect control, the hoarder must not trash anything that might be needed in the future, which necessitates checking rituals and mental compulsions before discarding any objects (44, 45).

Although these results differ from some published studies (46, 47) they are consistent with those in terms of psychometric results. The results show excellent and supportive reliability with high internal consistency (>.90) for the overall score of the OCI-CV in the youth community sample in Malaysia. These results were consistent with previous studies that reported estimates internal consistency that were greater than > 0.80 for the total score and > 0.75 for all of the six dimensions (15, 19, 21, 23, 25). Consequently, this indicates that the applications of the OCI-CV across culture and society provide good psychometric properties even if the factors in the Malaysian context are different from the original version.

TABLE 4. Factor Structure of Validated Malay OCI-CV

Malay OCI-CV	Factor					Item Total Correlation	Cronbach's α
	1	2	3	4	5		
Subscale 1: Ordering/Washing							
8. I get upset if my stuff is not in the right order.	0.75					0.56	0.897
17. I get upset if people change the way I arrange things.	0.74					0.42	0.900
10. I worry a lot about things being clean.	0.65					0.62	0.895
2. I feel like I must wash and clean over and over again.	0.66					0.37	0.901
21. I wash my hands more than other kids.	0.63					0.41	0.901
19. I need things to be in a certain way.	0.57					0.51	0.898
Subscale 2: Doubting							
4. I check many things over and over again.		0.71				0.59	0.896
5. After I have done things, I'm not sure if I really did them.		0.71				0.50	0.898
13. Even after I'm done I still worry that I didn't finish things.		0.61				0.56	0.897
20. Even when I do something very carefully I don't think I did it right.		0.58				0.59	0.896
9. I get behind in my school-work because I repeat things over and over again		0.57				0.59	0.896
1. I think about bad things and can't stop.		0.53				0.56	0.897
Subscale 3: Obsessing							
14. I get upset by bad thoughts that pop into my head when I don't want them to.			0.75			0.54	0.897
11. I'm upset by bad thoughts.			0.75			0.61	0.895
18. If a bad thought comes into my head, I need to say certain things over and over.			0.55			0.56	0.897
Subscale 4: Checking							
12. I have to say some numbers over and over.				0.72		0.38	0.901
6. I need to count while I do things.				0.68		0.52	0.898
15. I check doors, windows, and drawers over and over again.				0.56		0.42	0.900
Subscale 5: Hoarding							
7. I collect things I don't really need.					0.77	0.51	0.898
3. I collect so much stuff that it gets in the way.					0.77	0.54	0.897
16. I don't throw things away because I'm afraid I might need them later.					0.49	0.63	0.895

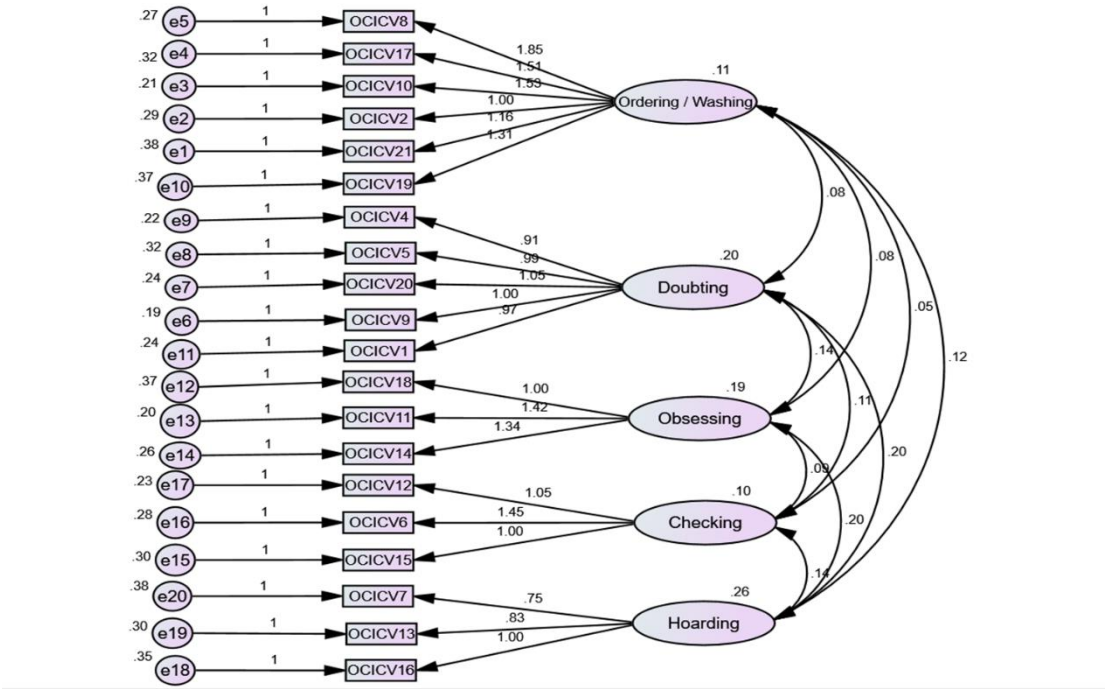

FIGURE 1. Figure 1 Standardized Estimate for five Factors Model Fit of OCI-CV Malay version

Overall, the Malay version of OCI-CV has been proven to be an excellent instrument for assessing obsessive-compulsive symptoms in children and adolescents in Malaysia. The result of this study had shown good psychometric properties of the OCI-CV, similarly to the original study by Foa et al. (2010) when we administered it to the Malaysian community.

Limitation

A major limitation of this study is its small sample size, which results in low statistical power to enable generalisation to the community population. In addition, the present study sample consists of a nonclinical sample from a single Malay ethnic community that practises Islam. Thus, future studies should examine the psychometric features of OCI-CV in the context of Malaysia's multi-ethnic (Malay, Chinese, Indian, etc.) and multi-religious (Islam, Buddhism, Hinduism, Christianity, etc.) contexts. The recruitment of samples was conducted during the COVID-19 pandemic which hindered the researcher's ability to recruit a larger sample for running a good confirmatory analysis. Additionally, the samples were primarily drawn from a single school in Selangor, and the respondents were mostly secondary students. Another limitation is that the education levels of parents or their socioeconomic information are misreported by their children (48). This could be due to children's cognitive and social skills are still developing, may need parent confirmation especially for lower cognitive ability(49). Subsequent expected issues are response quality and cause differential measurement inaccuracy (50, 51). The present study also was unable to provide information about psychometric properties of OCI-CV among the clinical population. Validating this instrument among the clinical samples should be undertaken in future research to ensure the instrument is reliable for use in the Malaysian context.

Conclusion

The current study validating the Malaysian version of the OCI-CV revealed several promising findings, including the availability of assessments of OCD symptoms and severity based on the five supplied multidimensional criteria and appropriate reliability and validity to account for demographic differences as well as screen potential OCD symptoms among healthy adolescents. Additionally, the current data are compatible with the original version and past research on the structural models of OCD and its symptoms. Our study contributes to the growing body of knowledge and increased cross-cultural acceptance of OCI-CV as a self-report measure for identifying OCD symptoms in Malaysian society, particularly among children and adolescents.

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Disclosures

The authors declare no conflict of interest.

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