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ORIGINAL ARTICLE

The Cyberchondria Severity Scale-Short Form: A Psychometric Study

Siberkondri Ciddiyet Ölçeği-Kısa Formu: Psikometrik Bir Çalışma

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ABSTRACT

Background/Aims: This study was conducted to evaluate the psychometric properties of the Cyberchondria Severity Scale-Short Form.
Methods: This is a methodological-type study. Voluntary adult individuals, registered to three different family-health-centers located in Ankara were included in the study (n=322). The data were collected online using Google forms in July 14-August 8, 2021, via a questionnaire, the Cyberchondria Severity Scale-Short-Form (CSS-12-TR) and the Health Seeking Behavior Scale (HSBS). The data were analyzed via the IBM-SPSS 25.0 and IBM-AMOS 24.0. The Davis method for the content validity, The Explanatory and Confirmatory Factor Analysis methods for the construct validity were applied. The criterion-dependent validity was assessed via the concurrent validity method. Cronbach's alpha, the split-half and test-retest (n=32) reliability tests were used.
Results: The mean age was 31.95±12.45 (min. 18-max. 65). The content validity index of the scale was 0.93. The CSS-12-TR and the HSBS was found moderately correlated (r=0.485, p<0.001). The model-fit indexes were mostly in perfect agreement. The Cronbach's alpha coefficient of the total scale was 0.884, and between 0.751-0.822 for the sub-dimensions. The variance between the test-retest measurements was statistically insignificant (t=0.447, p=0.658) and correlated (r=0.759, p<0.001). The intraclass correlation coefficient was 0.936 (F=15.699, p<0.001).
Conclusion: The CSS-12-TR with 12 items and four sub-dimensions was found as an easy to implement, valid and reliable instrument for Turkish community-dwelling adult population. Since the cyberchondria can potentially be a problematic issue for all adult groups, its psychometric structure is recommended to be re-conducted with the Turkish older adult population.

Keywords: Anxiety, Factor analysis, Hypochondriasis, Internet, Research methodology

ÖZ

Amaç: Bu çalışma Siberkondri Ciddiyet Ölçeği-Kısa Formunun psikometrik özelliklerini değerlendirmek amacıyla yapıldı.
Yöntem: Çalışma metodolojik tipte yapıldı. Araştırmaya Ankara'da bulunan üç farklı aile sağlığı merkezine kayıtlı gönüllü yetişkin bireyler dahil edildi (n=322). Veriler, 14 Temmuz-8 Ağustos 2021 tarihlerinde çevrimiçi olarak kişisel bilgi formu, Siberkondri Ciddiyet Ölçeği-Kısa Form (SCÖ-12-TR) ve Sağlık Arama Davranışı Ölçeği (SADÖ) kullanılarak Google formlar aracığıyla çevrimiçi olarak toplandı. Veriler IBM-SPSS 25.0 ve IBM-AMOS 24.0 programları kullanılarak analiz edildi. İçerik geçerliği için Davis yöntemi, yapı geçerliği için Açımlayıcı ve Doğrulayıcı Faktör Analizi yöntemleri uygulandı. Ölçüt bağımlı geçerlikte eşzaman geçerliği yöntemi kullanıldı. Cronbach alfa, iki yarıya bölme testi ve test-tekrar test (n=32) güvenilirliği kullanıldı.
Bulgular: Katılımcıların ortalama yaşı 31.95±12.45 idi (min.18-maks.65). Ölçeğin kapsam geçerlik indeksi 0.93 olarak bulundu. SCÖ-12-TR ile SADÖ arasında orta düzeyde korelasyon olduğu belirlendi (r=0.485, p<0.001). Model uyum indeksleri çoğunlukla mükemmel uyum içerisindeydi. Cronbach alfa katsayısının ölçek toplamı için 0.884, alt boyutları için 0,751-0,822 arasında olduğu bulundu. Test-tekrar test ölçümleri arasındaki varyans istatistiksel olarak anlamsız (t=0,447, p=0,658) ve korele (r=0,759, p<0.001) idi. Sınıf içi korelasyon katsayısının 0.936 (F=15,699, p<0.001) olduğu belirlendi.
Sonuç: 12 madde ve dört alt boyuttan oluşan SCÖ-12-TR'nin, toplumda yaşayan Türk yetişkin bireyler için uygulaması kolay, geçerli ve güvenilir bir araç olduğu belirlendi. Siberkondri potansiyel olarak tüm yetişkin gruplar için sorun teşkil edebileceğinden, psikometrik yapısının Türk yaşlı yetişkin nüfusu ile yeniden yapılması önerilir.

Anahtar kelimeler: Anksiyete, Araştırma metodolojisi, Faktör analizi, Hipkondriazis, İnternet

Introduction

The internet use has been in a must-have position on a daily basis of today's world. In Turkiye, 85% of the 16-74 age group had been reported as the internet users in 2022 (1). An increasing number of individuals are known to incline into the internet to search for health-related knowledge (2). In the European Union, it has been reported that 55% of Europeans aged 16-74 search for health-related information online (3). In Türkiye, it has been reported that 68.2% of adults search for health information online (4). Nevertheless, cyberchondria term, which comes into light nowadays, is asserted as the "negative side" of the increased interest in the improving information and communication technology environment. Cyberchondria refers to excessive or repetitive health related information search on the internet associated with increased levels of health anxiety (2). Cyberchondria is stated as a process by which generally results in interruption of other daily activities and generally a physician consultation in response to increased distress or anxiety as a result of health-related knowledge search on the internet (5, 6). Cyberchondria can occur in accordance with the change in the focus of health related knowledge search on the internet within time whether between different

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individuals or even in one person (5). In a longitudinal study conducted by te Poel et al., the more the health anxiety of the individuals was stated the higher the rate of health-related information search on the internet (7). In the study of Mohammed et al., cyberchondria was reported higher in the one-thirds of individuals who searched for the health information on the internet (8). Cyberchondriacs tend to neglect their responsibilities and/or activities, or change their priorities in their living, education and working environments. This situation can also make negative impacts on their social and interpersonal interactions (5, 6).

There has been stated a potential behavioral dependence relationship between the problematic internet use and cyberchondria (5, 6, 9). In the study of Durak-Batıgün et al., health anxiety associated with cyberchondria was positively related to the internet addiction (10). In cyberchondria, excessive health-related knowledge searching on the internet causes anxiety, and this can direct the help-and-treatment-seeking behavior (5). Cyberchondria is also be associated with the increased healthcare service usage, measured by the number of visits to various health professionals (11). Additionally, in some cases, individuals may also prefer to cope with the cyberchondria-based anxiety on their own by avoiding consultation to the healthcare professionals. This can eventuate an increase in the undesirable effects and a decrease in proper healthcare service seeking. Therefore, it is stated that cyberchondria can cause highly negative impacts on health both individual and community levels from the community-health perspective (5).

The very-first tool, which measures the cyberchondria severity, was developed by McElroy and Shevlin as 33 items and five subscales with five-point Likert-type, in 2014 (12). Although scientific evidences and research related to cyberchondria has been increased gradually following this development, more studies are required to investigate the factors associated with cyberchondria and its effects in various areas (2, 5). Along with the current studies examining the cyberchondria in Turkiye (10, 13), the need for the tools which measure cyberchondria severity has been accordingly increased. Although there was a validated brief cyberchondria severity measurement tool into Turkish by Tuğtekin and Tuğtekin, the sample group in that study was comprised of university students (14). When the higher risk of gaining cyberchondria behavior among the middle-aged adult individuals living in Turkiye is considered (10), the need of a practical measurement tool, which is specific to Turkish adult population, is thought to emerge. In this context, it is thought that an acceptable, effective, valid and reliable measurement of cyberchondria severity in the Turkish adult population will facilitate future studies on the subject. Therefore, the factors associated with the cyberchondria severity among Turkish adult group could be well defined with an internationally accepted and culturally adapted measurement tool in order to motivate this group to change cyberchondria behavior.

This study was conducted to evaluate the psychometric properties of the Cyberchondria Severity Scale-Short Form with 12 items.

Methods

Study type

This methodological study was conducted to evaluate the Turkish validity and reliability of the Cyberchondria Severity Scale-Short Form (CSS-12-TR). This study was reported according to the Guidelines for Reporting Reliability and Agreement Studies (GRRAS) checklist (15).

Participants

The population was composed of adult individuals (18-65 age group) registered to three different family health centers located in the capital city of Türkiye. In the validity and reliability studies, the sample size is recommended to be at least five to 10 times larger than the number of items in the scale to be performed the factor analysis (16). Moreover, the sample size with at least 20 times larger than the number of items in the scale is also suggested in order to create a more solid structure in the scale (16). Therefore, 322 individuals, who agreed to participate in, were included in the study via using a convenience-sampling method (n=322). In test-retest reliability, the scale is recommended to be re-applied to the 10-20% of the sample within 2-6 weeks later from the first application (17). In this study, the retest of the scale was performed to the 10% of the selected sample four weeks later from the first application date (n=32).

The inclusion criteria were; a) being 18 and older age, b) being social media (the WhatsApp) user, c) having the skill and the technical opportunities of filling an online questionnaire, and d) speaking Turkish as the mother tongue. The exclusion criteria were; a) having any visual problem, b) having any neuropsychiatric disorder, c) being unable to fill the online forms independently. Because of having special and complex health needs, individuals who were older 65 years old were also excluded from the study.

Data collection tools

A questionnaire, the Cyberchondria Severity Scale-Short Form and the Health Seeking Behavior Scale (HSBS) were used to collect the data.

The questionnaire

It was prepared by the researchers as nine questions to determine the sociodemographic features and the internet usage habits of the adults, according to the related literature (5).

The Cyberchondria Severity Scale-Short Form

It was developed according to the 33-item scale prepared by McElroy and Shevlin (12) as short form with 12 items by McElroy et al (18). The Cyberchondria Severity Scale-Short Form is used to evaluate the behavior of searching for diseases on the internet about the health problems that individuals think they may have (18). It is a five-point Likert-type scale (1=never-

5=always) with four sub-dimensions (excessiveness, compulsion, reassurance, distress). Total score can be gathered from the scale is minimum 12, and maximum 60. The higher the total mean score, the higher the cyberchondria severity level. The Cronbach's alpha of the total scale was 0.90, and the Cronbach's alpha values of the sub-dimensions varied between 0.755-0.855 in the original study (18).

The Health Seeking Behavior Scale (HSBS)

It was developed by Kıraç and Öztürk in order to determine the health seeking behavior (19). The HSBS is a five-point Likert-type scale (1=strongly disagree-5=strongly agree) with 12 items and three sub-dimensions (online health seeking, professional health seeking, traditional health seeking). Total score can be gathered from the scale is minimum 12, and maximum 60. The higher the total mean score, the higher the health seeking behavior level. The Cronbach's alpha of the total scale was 0.75 in the original study (19), and it was calculated as 0.73 in this study.

Data collection process

The data were collected in July 14-August 8, 2021. The data collection tools were transformed into an online form using Google Forms because of the ongoing COVID-19 pandemic. The link of the online form was shared to the individuals who visited the related health centers between the data collection dates via the WhatsApp with the help of local authorities of the selected family health centers. The online form was designed to gather the e-mail addresses of the participants and restrict the second access by the same person. The explanation of the study aim, characteristics of the focus group of the study (i.e., age, obligations of having an e-mail address, living in the area of the selected family health centers etc.), and participant approval were presented on the first page of the form. The participants were not allowed to reach the data collection tools before approving their voluntary participation. The answers were only allowed to be changed by the participants before the submission of the form. The re-test link was sent to the participants via the WhatsApp and e-mail. It took approximately 10 minutes to be filled the data collection tools.

Cultural adaptation process of the scale

The cultural adaptation of the scale was carried out in three stages as language validity, content validity and pilot testing (17).

Language validity

Translate-back translate approach was used to ensure the language validity. Two researchers, who are experts in the field of public health nursing, and know both Turkish and English cultures and languages well, translated the scale. The translated versions were merged, discussed, and reached a consensus by the research team. Prepared Turkish form was translated back to English by an independent researcher, who is a native English speaker, also speaks Turkish fluently, and the differences of the expressions in the original scale were assessed. The Turkish translation of the scale containing the agreed statements, and the original of the scale were presented to the experts in the field for language and content validities. In line with the experts' suggestions for expression changes, the final version of the Turkish version of the scale was created (Cyberchondria Severity Scale-Short Form-Turkish [CSS-12-TR]).

Content validity

The Davis method was used to assess the content validity of the scale (20). The draft form of the CSS-12-TR was sent to 11 experts from different fields of nursing science working with the adult group and specialized in the methodological research. The experts were requested to evaluate the understandability of the scale items in a four-point Likert type (1= strongly inapplicable-4=strongly applicable) scoring sheet. The content validity ratio was accepted as ≥0.80 for the sufficiency of per item (20).

Pilot Test

Following the content validity of the CSS-12-TR, the scale was presented to 12 adults in order to assess its readability and understandability. Subsequently ensuring its readability and understandability, the scale was applied to these 12 adults. Any changes were not performed in the scale after the pilot test. Those who participated in the pilot testing were not included in the study sample.

Assessment of the psychometric properties of the CSS-12-TR

The total and the sub-dimension' mean scores of the scale, and the proportion of floor-ceiling effect were calculated to be assessed the psychometric properties of the CSS-12-TR. The floor-ceiling effect value was accepted as less than 20% in this study (17). Then, the validity and reliability analysis were performed.

Validity analysis

The construct validity of the CSS-12-TR was evaluated via Explanatory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) methods. Before the EFA, the suitability of the data set to the factor analysis was assessed via the Bartlett's Test of Sphericity ($p<0.05$) and the Kaiser-Meyer-Olkin coefficient (KMO≥0.60) (16).

The principal component analysis and since the factors were independent from each other the Varimax rotation method were used to determine the factor loads. Factor load was accepted significant as >0.32 (16). The multicollinearity between the items and the sub-dimensions of the CSS-12-TR was tested via linear regression analysis (21).

Confirmatory Factor Analysis (CFA) was applied to examine whether the theoretical structure obtained for the scale was provided in the study sample. Maximum likelihood estimation method was used in the CFA. The Chi-Square Goodness [CMIN/df]≤5, Goodness of

Fit Index [GFI]≥0.90, Comparative Fit Index [CFI]≥0.90, Normed Fit Index [NFI]≥0.90, Tucker-Lewis Index [TLI]≥0.90, Incremental Fit Index [IFI]≥0.90, Root Mean Square Error of Approximation [RMSEA]<0.80, and Standardized Root Mean Square Residual [SRMR]<0.08 fit indexes were calculated in the CFA (22).

The criterion-dependent validity of the CSS-12-TR was assessed via the concurrent validity method. In this context, the Health Seeking Behavior Scale (HSBS) and the CSS-12-TR were applied simultaneously. The relationship between the total mean scores of these two scales, and the CSS-12-TR total score and the total score of each item in the scale were examined via the Pearson correlation coefficient. Because there has not been a standard evaluation approach, a general guideline's suggestion to correlation values were accepted: <0.30 indicates little or no agreement, a correlation between 0.30-0.40 indicates fair agreement, a correlation between 0.41-0.60 indicates moderate agreement, 0.61-0.70 indicates good agreement, a correlation between 0.71-0.75 indicates very good agreement, and a correlation >0.75 indicates excellent agreement (23).

Reliability analysis

The internal consistency of the CSS-12-TR was assessed via the Cronbach's alpha coefficient, the split-half test, and item-total correlation coefficients and the correlation between the items and the subscales of the scale. The Cronbach's a ≥0.70 was assessed as acceptable (17). In the split-half test, the Cronbach's alpha coefficients of the two halves were evaluated ≥0.60; Spearman-Brown and Guttmann Split-Half coefficients were ≥0.70 as acceptable (17). Item-total correlation coefficients were accepted to be positive and above 0.20 (17).

Test-retest method was used to test the time invariance of the CSS-12-TR. Test-retest reliability was assessed four weeks later from the first application via paired samples t-test (p>0.05), Pearson correlation coefficient and Intraclass Correlation Coefficient (ICC). ICC <0.50 was interpreted as little reliability, between 0.50-0.75 as moderate reliability, between 0.76-0.90 as good reliability, and >0.90 as excellent reliability (24).

The construct reliability of the CSS-12-TR was assessed via Composite Reliability (CR) coefficient (CR>0.70). The convergent validity between the items in the sub-dimensions of the CSS-12-TR was determined via Average Variance Extracted (AVE) value (AVE>0.50) (22). Discriminant validity of the CSS-12-TR was tested via Heterotrait-Monotrait (HTMT) ratio of correlations. HTMT value for each sub-dimensions of the scale with <0.90 was determined as adequate (25).

Data analysis

The data were analyzed via the IBM SPSS 25.0 and IBM AMOS 24.0 package programs. The normality of the data was evaluated via the Shapiro-Wilk test. The content validity ratio of per item and content validity index of the total scale were calculated using the experts' scoring. The construct validity was tested via EFA and CFA. Tukey's Test for Non-Additivity was used to evaluate the additivity of the scale. The Hotelling T2 test was used to determine whether the given responses to the items by the participants were similar. Statistical significance value was accepted as, p<0.05.

Ethical considerations

A written permission from Dr. Eoin McElroy, the developer of the scale, was gathered via e-mail. An ethical approval was obtained from the university's ethical committee (16.04.2021-73) before conducting the research. An informed consent was gathered from the participants. The informed consent, which included the aim of the study, the information about the data collection tools and the assurance of personal data protection according to the Turkish regulations, was presented on the first page of the online form. The online form was designed in such a way that individuals could see the questions after their consent was obtained.

Results

Sociodemographic characteristics are depicted on the Table 1. The mean age of the participants was 31.95±12.45 (min. 18-max. 65).

The content validity ratio of per item in the CSS-12-TR was found to vary between 0.82-1.00, and the content validity index of the scale was 0.93.

Table 1. Sociodemographic characteristics of the participants (n=322)

Sociodemographic characteristics	n	%
Gender		
Woman	242	75.2
Man	80	24.8
Marital status		
Single	181	56.3
Married	141	43.7
Graduation		
Literate-Elementary school	15	4.7
Secondary school	105	32.6
Bachelor's and above	202	62.7
Employment status		
Yes	141	43.8
No	181	56.2
Income level		
Less than expense	101	31.4
Equal to expense	179	55.6
More than expense	42	13.0
Having any co-morbidity		
Yes	85	26.4
No	237	73.6
Self-health perception		
Poor	5	1.6
Moderate	122	37.9
Good	176	54.7
Excellent	19	5.9
Daily internet usage time		
Up to 2 hours	87	27.0
3-4 hours	121	37.6
5 hours and above	114	35.4

Table 2. Suitability to the factor analysis results of the CSS-12-TR

Subscales	Items	Item score	Factor loadings after varimax rotation	Extraction values	r	Explained variance	Cumulative variance	KMO	X^2	p
		Mean (SD)				%	%			
Excessiveness	Item 1	3.15 (0.06)	0.787	0.724	0.886	44.356	71.643	0.863	1750.903	<0.001
	Item 3	3.02 (0.06)	0.849	0.796	0.822					
	Item 6	3.28 (0.07)	0.730	0.706	0.871					
Compulsion	Item 2	1.75 (0.05)	0.673	0.682	0.880	12.480				
	Item 7	1.46 (0.05)	0.838	0.808	0.807					
	Item 10	1.45 (0.05)	0.777	0.741	0.814					
Reassurance	Item 5	2.66 (0.07)	0.703	0.705	0.870	8.471				
	Item 11	1.80 (0.06)	0.621	0.605	0.901					
	Item 12	2.47 (0.07)	0.807	0.777	0.844					
Distress	Item 4	2.41 (0.06)	0.682	0.683	0.869	6.336				
	Item 8	2.26 (0.07)	0.730	0.616	0.934					
	Item 9	2.41 (0.06)	0.725	0.754	0.881					

X2: Bartlett's Test of Sphericity; KMO: Kaiser-Meyer-Olkin; r: item-total correlation

Table 3. Correlation analysis results of the CSS-12-TR

Scales and sub-scales	Mean (SD)	Multicollinearity of subscales		Total CSS-12-TR	
Total CSS-12-TR	29.19 (8.76)	Colli-nearity tolerance	Statistics VIF	r	p
Excessiveness	9.45 (2.79)	0.606	1.651	0.796	<0.001
Compulsion	4.65 (2.14)	0.702	1.425	0.691	<0.001
Reassurance	6.92 (2.75)	0.535	1.869	0.834	<0.001
Distress	7.09 (2.74)	0.476	2.099	0.860	<0.001
Total HSBS	37.81 (6.62)			0.485	<0.001
Online health seeking	16.71 (4.83)			0.527	<0.001
Professional health seeking	11.13 (2.44)			0.030	0.587
Traditional health seeking	9.96 (2.54)			0.232	<0.001

r: Pearson correlation coefficient; collinearity tolerance was accepted >0.2; VIF was accepted <10

Table 5. Convergent and discriminant validity results of the CSS-12-TR

Subscales	CR	AVE	HTMT			
			Excessi-veness	Com-pulsion	Reassu-rance	Distress
Excessive-ness	0.832	0.624				
Compulsion	0.808	0.586	0.436			
Reassu-rance	0.755	0.510	0.707	0.588		
Distress	0.755	0.511	0.721	0.694	0.823	

CR: composite reliability; AVE: Average Variance Extracted; HTMT: heterotrait-monotrait ratio of correlations

Table 4. Reliability analysis results of the CSS-12-TR

Scale and subscales	Cronbach's alpha	Items	Item-total corre-lation	Cronbach's alpha if item deleted
Excessiveness	0.822	Item 1	0.611	0.873
		Item 3	0.607	0.873
		Item 6	0.601	0.874
Compulsion	0.751	Item 2	0.459	0.881
		Item 7	0.523	0.878
		Item 10	0.491	0.880
Reassurance	0.761	Item 5	0.627	0.872
		Item 11	0.564	0.876
		Item 12	0.623	0.872
Distress	0.761	Item 4	0.667	0.870
		Item 8	0.523	0.879
		Item 9	0.714	0.867
CSS-12-TR	0.884			

Total score of the CSS-12-TR	Mean (SD)	t	p	r	p	ICC	p
First measu-rement	29.19 (8.76)	0.447	0.658	0.759	<0.000	0.936	<0.001
Second measure-ment	28.72 (8.27)						

t=paired-samples test; r=Pearson correlation coefficient; ICC: intraclass correlation coefficient

Psychometric test results

Validity analysis results

The suitability of the data set to the factor analysis results of the CSS-12-TR is shown in the Table 2. The results of the Bartlett's Test of Sphericity and the KMO coefficient indicated that the dataset was applicable to the EFA (df=66, p<0.001). The extraction values of the items were >0.30, and all the diagonal values in the Anti-image correlation matrix were >0.60 (0.807-0.934). The factor structure of the original scale was preserved in the CSS-12-TR (Figure 1.). All the four sub-dimensions of the CSS-12-TR were found the explain 71.643% of the total variance (Table 2.).

The relationship between the total mean scores of the CSS-12-TR and the HSBS and the sub-dimensions of both scales is depicted in Table 2. The CSS-12-TR and the HSBS was moderately correlated (r=0.485,

p<0.001). The correlation coefficients of the total mean score of the CSS-12-TR and its sub-dimensions were found between 0.691-0.860 (p<0.001) (Table 3.). Although it was not depicted on the table, the correlation coefficients between the total mean score of the CSS-12-TR and its items were identified between 0.551-0.774 (p<0.001).

The correlation coefficients between the total mean scores of the sub-dimensions of the CSS-12-TR were >0.30 (min=0.351; max=0.626), and there was not a multicollinearity between the sub-dimensions of the scale (Adjusted R^2=0.713, F=200.501, p<0.001). All these results showed that the scale construction was suitable to conduct the CFA (Table 3.).

The standardized coefficients of the CSS-12-TR are depicted in the path diagram (Figure 2.). The model fit indexes, which were gathered via first level CFA using maximum likelihood estimation method and conducting three modifications with 12 items and four sub-dimensions obtained following the EFA, were found to be CMIN=158.625, CMIN/df=2.993, GFI=0.927, CFI=0.938, RMSA=0.79, SRMR=0.054, NFI=0.911, TLI=0.923, and IFI=0.939.

Reliability analysis results

The scale was found to be in the additivity characteristic, according to the Tukey's Test for nonadditivity result (F=56.973; p<0.001). Moreover, there was no response bias in the scale (Hotelling T2=1033.411; F=91.020; p<0.001).

The Cronbach's alpha coefficients of the CSS-12-TR and its sub-dimensions are shown in the Table 4. The Cronbach's alpha coefficient of the total scale was 0.884, and the Cronbach's alpha coefficients of the sub-dimensions were between 0.751-0.822.

In the split-half reliability of the CSS-12-TR, the scale was separated into two parts as part-1 (items: 1-6) and part-2 (items: 7-12). Cronbach's alpha coefficient of the part-1 and the part-2 were 0.820 and 0.801, respectively. Spearman-Brown coefficient was 0.831 for each part, and Guttmann Split-Half coefficient was 0.829.

Item-total correlation values of the CSS-12-TR varied between 0.459-0.714, and all correlation values were positive (Table 4.).

The test-re-test reliability results of the CSS-12-TR are shown in the Table 4. The variance between the two measurements was statistically insignificant (t=0.447, p=0.658), and the correlation between the two measurements was found as r=0.759 (p<0.001). The intraclass correlation coefficient was 0.936 (F=15.699, p<0.001).

The convergent and discriminant validity results, which prove the construct reliability of the scale, are shown in the Table 5. The CR values of the four sub-dimensions were found between 0.755-0.832 (CR >0.70), and the AVE values were between 0.510-0.624 (AVE >0.50). HTMT correlations of the subscales were between 0.436-0.823 (Table 5.).

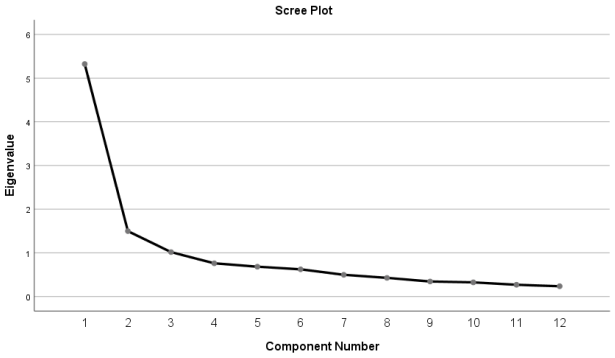

Figure 1. Scree plot chart of the factor structure

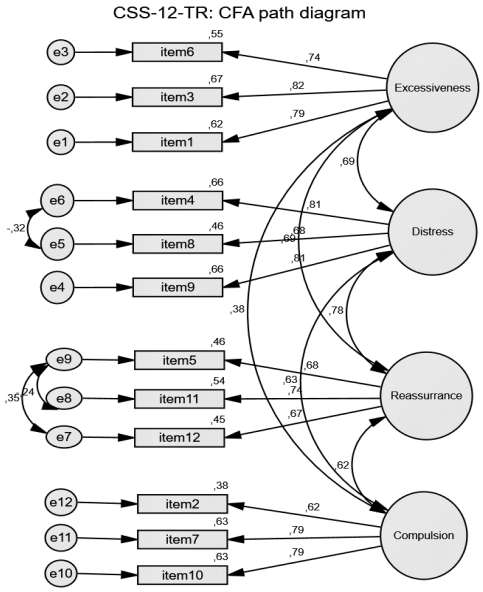

Figure 2. Path diagram of CFA

Discussion

The short form of The Cyberchondria Severity Scale with 12 items was adapted to Turkish culture (CSS-12-TR) in this study. The CSS-12-TR was found as a valid and reliable tool for the Turkish adult population in terms of psycholinguistics and psychometric validity and reliability criteria in the related literature (16, 17, 20-25).

The content validity ratio is recommended to be ≥0.80 per scale item (20). In this study, it was found that the content validity ratio per item of the CSS-12-TR ranged between 0.82-1.00, so the original structure of the scale was preserved, and no items were omitted. The sufficiency of the sample size for the factor analysis is suggested to be evaluated via accepting the Bartlett's Test of Sphericity as statistically significant (p<0.05) and the KMO coefficient as ≥0.60 in the literature (16). In this study, KMO coefficient was very above the reference value, and the result of the Bartlett's Test of Sphericity was statistically significant. Therefore, items of the CSS-12-TR were accepted as suitable to the factor analysis. The explained variance rate is recommended to be

at least 30% for one-factor structured scales and >50% for the scales with multifactorial structure (17). In this context, it was found that the four factor-structured CSS-12-TR met this recommendation with the above of 70% explained variance. CFA is performed to test the relation between the scale items, correlations between the items and described factors, whether the defined factors are freed from each other and sufficient enough to explain the model structure (22). In this study, the correlation coefficient between the items, the factors and CSS-12-TR were found mostly at moderate levels. Moreover, the results of the model fit indexes obtained via CFA were found mostly in perfect fit. These findings presented in better or excellent agreements, which were in line with the development study of the scale (18), and the other Turkish version which was conducted with the education faculty students' sample (14).

In the concurrent validity, moderate to excellent correlation values show the similarity of measured constructs, however, lower correlation coefficients indicate the difference between the measurements of the constructs (23). Similar to the original study of the scale (18), the significant correlation between the CSS-12-TR revealed moderate agreement to the Health Seeking Behavior Scale.

The internal consistency reliability in the validity and reliability studies is recommended to be tested via split-half test and inter-item correlation coefficient along with the Cronbach's alpha coefficient (17). The Cronbach's alpha internal consistency coefficient was found highly acceptable in this study, similar to its original version (18) and the other Turkish version, which was conducted with the education faculty students' sample (14). Moreover, the split-half reliability of the CSS-12-TR was found also adequate, and its item-total correlation coefficients were in between positively moderate to very good agreement. Therefore, the CSS-12-TR was stated as an internally valid instrument for the Turkish general adult population.

Test-retest application is used to determine the consistency of a scale within a certain time interval (24). The correlation coefficient between the two measurements of the CSS-12-TR was found as in excellent agreement, and the Intraclass correlation coefficient was excellently reliable. Similar to the original form (18), the CSS-12-TR was also determined as a reliable tool in terms of construct reliability, which was tested via convergent and discriminant validity (CR >0.70; AVE > 0.50; CR >AVE; HTMT <0.90). All these results revealed that the measurement via the CSS-12-TR was consistent and reliable over time, similar to the related literature (14, 18).

Strengths and limitations

The current study has several strengths. Firstly, the adaptation study of the CSS-12-TR was conducted with the 18–65-year-old adult population living in Turkiye, which is thought to increase its availability and applicability in correlational studies with wider sample groups to be mapped the cyberchondria severity degree of the Turkish general adult population. Likewise, its relatively high sample size is considered as the other strength of the current study. However, the present study is not without limitations. Initially, obtaining the data via an online questionnaire may have affected the data quality. Secondly, individuals unable to use an active e-mail and the WhatsApp could not be included. The online data collection procedure made the retesting process difficult.

Conclusion

The CSS-12-TR is an easy to implement, valid and reliable instrument for Turkish community-dwelling adult population aged between 18 and 65. The two-step factor analysis revealed consistent results to its original study (18). The scale was also highly internally and structurally reliable. Since the cyberchondria can potentially be a problematic issue for all adult groups, its psychometric structure is recommended to be re-conducted with the Turkish senior adult population aged 65+ and older. When the increase in the online health-related information seeking behavior among the younger population is considered, the validity and reliability of the CSS-12-TR is also recommended to be re-performed to measure cyberchondria severity among Turkish teenagers.

Ethics Approval

It was gathered an ethical approval from the Ankara Yıldırım Beyazıt University's Ethical Committee (16.04.2021-73) before conducting the research. The online informed consent were obtained from the participants. This research conforms to all the provisions of the Declaration of Helsinki, 2013.

Author contribution statement

HT: Conceptualization, methodology, supervision, investigation, validation, visualization, formal analysis, writing-original draft, review & editing. AA: Conceptualization, methodology, data curation, writing-original draft, review & editing. SAA: Project administration, conceptualization, methodology, supervision, investigation, visualization, writing-original draft, review & editing.

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