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Validity and reliability study of coronavirus-related psychiatric symptom scale in children - parental form

Selma Tural Hesapçıoğlu[1], Sevilay Karahan[2], Dilber Ademhan Tural[3], Nagehan Emiralioğlu[3]

[1]Department of Child and Adolescent Psychiatry, Ankara Yildirim Beyazit University School of Medicine, Ankara, Turkey
[2]Department of Biostatics, Hacettepe University School of Medicine, Ankara, Turkey
[3]Department of Pediatric Pulmonology, Hacettepe University School of Medicine, Ankara, Turkey

What is already known on this topic?

- *The coronavirus disease 2019 (COVID-19) pandemic has caused mental distress in the whole society, especially in children. Children and adolescents may exhibit various psychiatric symptoms owing to isolation at home, not being able to socialize, having problems related to education, and having fears associated with COVID-19. The pandemic causes problems in the evaluation of psychiatric symptoms associated with COVID-19 in children and adolescents.*

What this study adds on this topic?

- *With this research, a scale was developed to enable parents to report the psychiatric symptoms associated with COVID-19 in their children and adolescents and to evaluate these symptoms by a physician. A helpful scale has been introduced to the literature.*

ABSTRACT

Objective: The aim of this study is to develop a scale to assess the psychiatric symptoms that may emerge owing to the coronavirus disease 2019 (COVID-19) pandemic period in children and adolescents aged 4-18 years.

Material and Methods: To develop the scale, first, interviews with children, adolescents, and their parents were conducted, and the possible psychiatric symptom clusters were detected. The items were written with reference to the literature and reviewed by the experts. A 40-item scale form was shared as an online survey, and a factor analysis of the scale was carried out with data obtained from 441 participants. The test-retest reliability of the scale was carried out with data obtained from the 51 participants who filled the scale again after 14 days.

Results: According to the item-total correlations and factor analysis results with 40 items, 5 items with low correlation and factor load or loaded same under the two factors were removed from the scale. The final form had 35 items and had a two-factor structure. The internal consistency coefficient of the scale was calculated as 0.96, and the test-retest correlation coefficient was 0.98.

Conclusion: Coronavirus-related psychiatric symptom scale in children - parental form is a valid and reliable scale for measuring perceived psychiatric symptoms associated with COVID-19pandemic in children aged 4-18 years by their parents.

Keywords: Anxiety, child, coronavirus, depressive symptoms, pandemics

Introduction

The rapid spread of the new type of coronavirus to the whole world after its first emergence has led countries to take measures rapidly. These struggle processes have come to cover a large part of the broadcast time of television channels over time. The processes experienced by people who lost the fight against coronavirus disease 2019 (COVID-19) and, unfortunately, the number of patients lost daily in each country are being discussed on television programmes (1).

Turkey has also taken measures to combat the COVID-19 in a short time after the virus was seen; schools in the country have all been closed for a while and then began training online. Individuals aged <20 years who are less affected by COVID-19 but are thought to have contributed to the spread of the virus, often asymptomatically, are restricted from going out (2). Thus, this young population have started to spend more time at home.

The rapid spread and high mortality of the new type of coronavirus lead to the emergence of mental problems in the society or the exacerbation of psychiatric problems, if any (3,4). In all

Corresponding Author:
Selma Tural Hesapçıoğlu
✉shesapcioglu@ybu.edu.tr
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these processes, COVID-19-related anxiety has prevailed in societies, and some individuals act by ignoring the risk of becoming infected, whereas others have begun to exhibit attitudes beyond the measures to be taken. Colizzi et al. (5) reported a 16-year-adolescent with severe COVID-19 symptoms requiring hospitalization responded to a low-dose antipsychotic and antidepressant, although his COVID-19 test was negative.

To understand this new, extraordinary situation emerging in the whole scientific world, scientific research has been started for this purpose (6). Physicians working with children and adolescents also try to understand the effects of the pandemic on children and adolescents. A study conducted in China showed that the adolescents without any companion at home during workdays were more depressed and anxious during the pandemic (7). Children and adolescents are vulnerable populations. Diagnosing the psychiatric disorders early could help to prevent exacerbation. There is a need to develop appropriate treatment approaches for the affected children and adolescents. However, efforts to minimize physical contact during the pandemic period inhibit parents to bring their children to the hospital.

In this process, pediatricians and child and adolescent psychiatrists need to understand how children and adolescents-who do not go to school, continue their education from their homes, and cannot go out of home -react to the pandemic. However, the problem is a newly emerged concept and face-to-face interviews cannot be made with children and adolescents unless there are compulsory situations makes a thorough evaluation difficult. The way to reach children and adolescents online can be provided using communication tools by parents. It is not clear how reliable answers will be obtained to the questions about the mental state of children and adolescents who are reached through their parents in the home environment.

There are some scales for evaluating depression and anxiety in children and adolescents; however, there is no scale that evaluates the depressive and anxiety symptoms associated with COVID-19.

In this study it was aimed to develop a useful measurement tool that can provide parents who can be reached with an online questionnaire to rate the psychiatric symptoms they notice in their children.

Material and Methods

Item pool composing

The process of writing the items of the scale was based on the interviews with children, adolescents, and their parents. Symptoms observed by parents who reached the child–adolescent psychiatry clinic by phone to consult about the mental symptoms of their children for 2 weeks were noted, and thus, the symptom clusters that could be encountered were determined. Later, these symptoms were evaluated and grouped according to the Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition and transformed to the scale items (8). There was no target to reach a specific number of items in this process; all the complaints of parents were taken into account. In such contexts, trying to measure the response to each component of the scale with repetitive items causes an overestimation problem (9, 10). The first version of the scale was created with a total of 40 items. These 40 items were generally defined to include anxiety and depressive symptoms. Depressive symptoms were created to cover the somatic, cognitive, and emotional symptoms of depression. Because academic expectations come to the fore, especially in children and adolescents, symptoms such as distraction, difficulty in maintaining attention, and avoidance of tasks that require attention, which may be associated with depressive mood, were also evaluated in this context. An adequate number of experts (5-40 experts) is required to get a high content validity (11). Expert opinion on these items was obtained from five child–adolescent psychiatrists. Expert opinions were analyzed with a content validity index. The content validity index of each item of the scale with 40items was determined as 1. This was considered to indicate a high agreement among the experts.

The scale items were scored as a four-point Likert-type scale: I do not agree at all (1), slightly agree (2), strongly agree (3), and completely agree (4). However, five of these items with low correlation and factor loading according to the factor analysis were excluded from the scale.

Participants and data collection

Before starting the study, approval was obtained from the Ethics Committee of Hacettepe University (Ankara, Turkey) (2020/10-47). All stages of the study were conducted in accordance with the revised version in the World Medical Association Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects 2013. An online survey system was used in the study. At the beginning of the survey, informed consent of the participants was obtained. The online questionnaire containing demographic information and scales was distributed to the participants. The online questionnaire was created in two forms: those with names and those without names. Parents who completed the scale were asked to mark the option that best expressed their child for each item in the scale. An online questionnaire was distributed, and the 453 parents who volunteered completed the scale within the study period. Among these responses, children whose age groups were outside the 4-18 years targeted by the scale were excluded from the study. Responses from a total of 441 parents were evaluated. The survey was sent for the second time with a 14-day interval to 72 of the parents who agreed to participate with their names. Retest data were evaluated with a total of 51 responses. All the evaluations were conducted online. The parents were asked to fill the General Health Questionnaire (GHQ) to report their own symptoms.

Data collection tools

The sociodemographic data form developed by the researchers to collect demographic data for the study, the measurement tool Coronavirus-related Psychiatric Symptom Scale in Children-Parent Form (CoV-PSY-CP) developed to understand the anxiety and depressive symptoms in children, and the GHQ for parents were used.

Sociodemographic data form

A standard form was used to collect demographic data of the children, along with information, such as age, sex family structure, and socioeconomic level of the parents participating in

the study. In addition, the participants and their spouses were asked about the psychiatric illness status and whether there were any individuals diagnosed with COVID-19 in their family or close circles.

Türkiş April 2020 data were used to evaluate the socioeconomic level as low or normal high (12).

General Health Questionnaire (GHQ)

This questionnaire was developed by Goldberg (13) to investigate acute mental illnesses that are common in the society. It has 12-, 28-, 30-, and 60-question forms. The total score is generally evaluated in studies, the subscale scores of the 28-item format can also be used (13). Each question asks about symptoms from the last few weeks and has four options (less than usual, no more than usual, rather more than usual, or much more than usual). These four columns are coded as 0, 1, 2, and 3 by the participant. It is common practice to calculate the total score by giving 0 to the first 2 columns and 1 to the last two columns (Goldberg calls this GHQ-type scoring). The Turkish validity-reliability study of the scale was conducted by Kılıç et al. (14). Internal consistency of GHQ12 was 0.78, sensitivity was 0.74, and specificity was 0.84.

Statistical analysis

Statistical Package for the Social Sciences (SPSS) version 23.0 (IBM SPSS Corp.; Armonk, NY, USA), and Stata 14.0 package programs were used for statistical analysis. Numerical variables were summarized with mean ± standard deviation, and categorical variables were summarized with numbers and percent ages. The evaluation of expert opinions was made with the content validity index. The corrected item-total correlations of the scale were calculated by item analysis and the Cronbach alpha coefficients when the item was deleted. Explanatory factor analysis (EFA) was used to determine the subdimensions of the scale. Kaiser Meier Olkin (KMO) sampling adequacy measure and Bartlett's test of sphericity were checked in order to apply EFA. Spearman correlation coefficient matrix calculated between items was used for factor analysis. The principal factor extraction method was used as the factor extraction method, and the Varimax method was used as the factor rotation method. Confirmatory factor analysis was used to verify the resulting factor structure. If the minimum discrepancy/difference (Cmin/df) value was between 2 and 3; the root mean square error of approximation (RMSEA) value was between 0.05 and 0.08; the rootmeansquareresidual (RMR) value was between 0.05 and 0.08; and the Bollen's incremental fit index (IFI), the comparative fit index (CFI), and the Trucker-Lewis Index (TLI) fit indices were >0.90, the confirmatory factor analysis results were assumed as acceptable. The internal consistency of the scale's subscales and that of the total were given with the Cronbach alpha coefficient. Whether the scale was correlated with the retest application for its reliability was checked with the Pearson correlation coefficient. Parametric test assumptions were checked before applying hypothesis tests. The normality of the continuous variables was controlled by the Kolmogorov–Smirnov test. Levene test was used to show variance homogeneity. Mann-Whitney U test was performed to investigate the two independent groups' differences according to scale score. The relationship between age and scale scores was determined by the Spearman correlation coefficient.

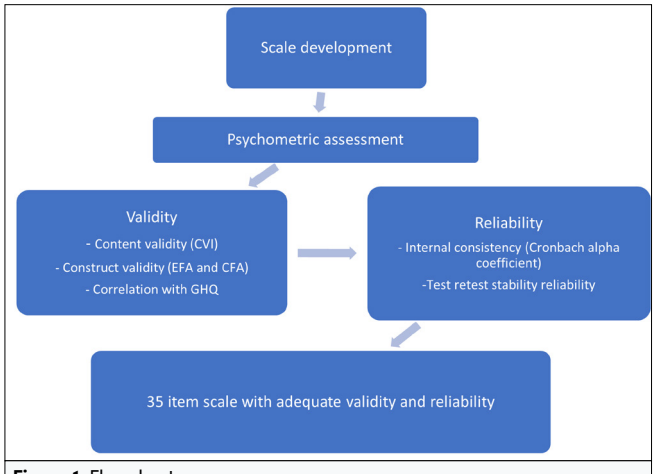

Figure 1. Flowchart

Results

Demographic variables

Of the 441 parents whose data were evaluated in the study, 349 (79.1%) were mothers, and 92 (20.9%) were fathers. Their average age was 40.0±5.8 (age range: 25-58 years) years. Of the children whose psychiatric statuses were scored, 211 (47.8%) were girls, and 230 (52.2%) were boys. The average age of the children was 10.1±3.8 years (age range: 4-18 years). The sociodemographic characteristics of the research participants are presented in Table 1.

Validity and Reliability of the CoV-PSY-CP

CoV-PSY-CP item-total correlations and factor analysis

EFA was performed with item-total correlations and all the 40 items (Table 2). According to the Spearman correlation coefficients calculated between the items, no correlation was >0.80. Because the corrected item-total correlations of items 29 and 32 and the correlations of these items with all other items according to the Spearman correlation matrix were <0.40, these items were excluded from the scale. The dataset was divided into two parts to apply factor analysis to the remaining 38-item structure. According to Horn's parallel analysis, there were two basic components in 221 person data (adjusted eigenvalues: 15.117 and 2.094). EFA was used for these data. The sampling adequacy measure was found to be appropriate (KMO=0.943), and the sphere city test result was found to be significant (Bartlett test P<.001). According to the results of the 38-item structure, items 14, 19, and 20 were excluded because they loaded on two factors at a similar level (Table 3).The resulting two factors explain 81.2% of the variance between the items in the scale.

Confirmatory factor analysis was applied in the other unused part of the dataset (n=220), and fit measures were examined. With the confirmatory factor analysis, first, the single-factor structure and then, the two-factor structure found by EFA on a35-item scale was tested. According to these results Cmin/df (2.344), RMSEA (0.078), and RMR (0.029) results of the two-factor structure are within the acceptable range, and the CFI (0.878), IFI (0.879), and TLI (0.866) results were found to be close to the acceptable range.

Table 1. Sociodemographic characteristics of the participants

Characteristics	Variable subheadings	N	%
Parent participating in the study	Mother	349	79.1
	Father	92	20.9
Family structure	Nuclear family	383	86.8
	Extended family	34	7.7
	Other	24	5.4
Socioeconomic status	Low	218	49.4
	Normal - high	223	50.5
Does she/he or her/his spouse have a psychiatric disorder?	No	400	90.7
	Yes	41	9.3
Is there anyone in the family or close environment affected with COVID-19?	No	423	95.9
	Yes	18	4.1

COVID-19: coronavirus disease 2019; N: number.

Table 2. CoV-PSY-CP item analysis

Item	Mean±SD	Adjusted item-total correlation	Cronbach alpha when the item is deleted
Item 1*	2.08±0.74	0.643	0.965
Item2*	1.89±0.73	0.594	0.965
Item3*	1.87±0.77	0.757	0.965
Item4*	1.32±0.54	0.656	0.965
Item5*	1.66±0.75	0.757	0.965
Item6*	1.64±0.76	0.766	0.965
Item7*	1.79±0.75	0.679	0.965
Item8*	1.31±0.60	0.638	0.965
Item9*	1.73±0.72	0.753	0.965
Item10*	1.35±0.61	0.747	0.965
Item11**	1.54±0.72	0.774	0.965
Item12**	1.50±0.72	0.737	0.965
Item13**	1.45±0.74	0.706	0.965
Item14*	1.51±0.74	0.787	0.964
Item15**	2.19±0.97	0.641	0.965
Item16*	1.48±0.67	0.694	0.965
Item17*	1.74±0.76	0.742	0.965
Item 18**	1.60±0.78	0.769	0.965
Item19*	1.27±0.56	0.583	0.965
Item20*	1.52±0.78	0.689	0.965
Item21**	1.29±0.59	0.642	0.965
Item22**	1.25±0.60	0.528	0.966
Item23**	1.51±0.78	0.647	0.965
Item24**	1.48±0.75	0.758	0.965
Item25**	1.44±0.72	0.644	0.965
Item26*	1.86±0.84	0.662	0.965
Item27**	1.27±0.60	0.599	0.965
Item28**	1.37±0.63	0.753	0.965
Item29*	1.05±0.27	0.276	0.966
Item30**	1.59±0.81	0.588	0.966
Item31**	1.28±0.63	0.569	0.966
Item32*	1.40±0.74	0.282	0.967
Item33**	1.25±0.50	0.516	0.966
Item34**	1.68±0.83	0.562	0.966
Item35**	1.24±0.55	0.507	0.966
Item36**	1.15±0.41	0.517	0.966
Item37**	1.15±0.49	0.459	0.966
Item38**	1.42±0.68	0.555	0.966
Item39**	1.36±0.66	0.671	0.965
Item40**	1.26±0.61	0.509	0.966

*: items that measure anxiety symptoms; **: items that measure depression symptoms; CoV-PSY-CP: Coronavirus-related Psychiatric Symptom Scale in Children-Parental Form; SD: standard deviation.

Table 3. CoV-PSY-CP factor analysis results

	First analysis (38 items)*		Second analysis (35 items)*	
Items	Factor 1	Factor 2	Factor 1	Factor 2
m7	0.1005	0.8267	0.1017	0.8301
m26	0.1018	0.8004	0.1004	0.7982
m17	0.2672	0.7958	0.2675	0.7979
m3	0.2877	0.7801	0.2892	0.7842
m1	0.1422	0.7750	0.1417	0.7759
m9	0.2313	0.7743	0.2349	0.7794
m2	0.0737	0.7576	0.0754	0.7596
m5	0.3737	0.6579	0.3749	0.6599
m6	0.4011	0.6561	0.4016	0.6568
m16	0.3969	0.5729	0.3959	0.5710
m4	0.3259	0.5591	0.3262	0.5560
m8	0.3482	0.4947	0.3488	0.4909
m19	0.4087	0.4830	–	–
m39	0.7130	0.2529	0.7137	0.2558
m25	0.6713	0.1749	0.6755	0.1820
m24	0.6641	0.4074	0.6608	0.4051
m38	0.6622	0.1196	0.6665	0.1267
m34	0.6450	0.1345	0.6478	0.1425
m11	0.6238	0.5004	0.6226	0.4984
m30	0.6237	0.1576	0.6254	0.1623
m12	0.6120	0.4149	0.6128	0.4157
m18	0.6088	0.4217	0.6077	0.4198
m28	0.5997	0.3749	0.5964	0.3720
m31	0.5995	0.1829	0.5985	0.1846
m13	0.5938	0.3921	0.5843	0.3858
m23	0.5937	0.3529	0.5916	0.3521
m14	0.5624	0.5596		
m10	0.5577	0.4577	0.5594	0.4595
m21	0.5256	0.3575	0.5144	0.3472
m36	0.5164	0.2158	0.5169	0.2163
m27	0.5009	0.2315	0.5000	0.2300
m35	0.4880	0.1207	0.4921	0.1257
m20	0.4837	0.4677		
m22	0.4830	0.2648	0.4747	0.2551
m37	0.4818	0.1687	0.4813	0.1695
m15	0.4753	0.3728	0.4775	0.3755
m33	0.4029	0.2989	0.4035	0.2994
m40	0.3867	0.1975	0.3879	0.2010
Eigenvalue	–	–	14.169	2.592
Variance description percentage	–	–	68.6%	12.6%

CoV-PSY-CP: Coronavirus-related Psychiatric Symptom Scale in Children - Parental Form. *: the acceptable factor load levels are shown with bold.

The confirmatory diagram of the confirmatory factor analysis is presented in Figure 2.

Internal consistency and test-retest correlations of the scale subdimensions and the total score

The internal consistency level of the scale is very good, and the Cronbach alpha coefficient was obtained as 0.943 for the anxiety subscale, 0.944 for the depression subscale, and 0.964 for the total score. Test-retest correlations showing invariance against time were found to be 0.978 for the anxiety subscale, 0.988 for the depression sub scale, and 0.988 for the total score.

Findings of the sample

Correlation analysis of the scales used in the research

Descriptive statistics of the GHQ and CoV-PSY-CP scales used in the study are presented in Table 4.Scale subdimensions and the total score were found to have a moderately positive correlation with GHQ (0.435, 0.419, and 0.449 for the subdimensions and the total score, respectively; Table 5).

Analyses of the CoV-PSY-CP in the sample

There was no statistical difference between the genders in terms of CoV-PSY-CP subscale scores. However, both the CoV-PSY-CP anxiety and depression subscale scores were significantly higher in the cases with low socioeconomic status. There was a positive correlation between the child's age and the CoV-PSY-CP anxiety and depression subscale scores and the total score (Table 6).

Table 4.Descriptive statistics of the scales used

Measurement	Mean±SD	Min-Max
GHQ	12.9±3.6	5-28
CoV-PSY-CPfactor 1	20.4±6.8	12-46
CoV-PSY-CPfactor 2	32.6±10.5	23-84
CoV-PSY-CP total	53.0±16.3	35-128

CoV-PSY-CP: Coronavirus-related Psychiatric Symptom Scale in Children - Parental Form; GHQ: General Health Questionnaire; Max: maximum; Min: minimum; SD: standard deviation.

Table 5.Correlation between CoV-PSY-CP and GHQ

	GHQ	
Total and subscales of CoV-PSY-CP	Correlation coefficient	*P*
CoV-PSY-CP factor 1	0.435	<0.001
CoV-PSY-CP factor 2	0.419	<0.001
CoV-PSY-CP total score	0.449	<0.001

CoV-PSY-CP: Coronavirus-related Psychiatric Symptom Scale in Children - Parental Form; GHQ: General Health Questionnaire.

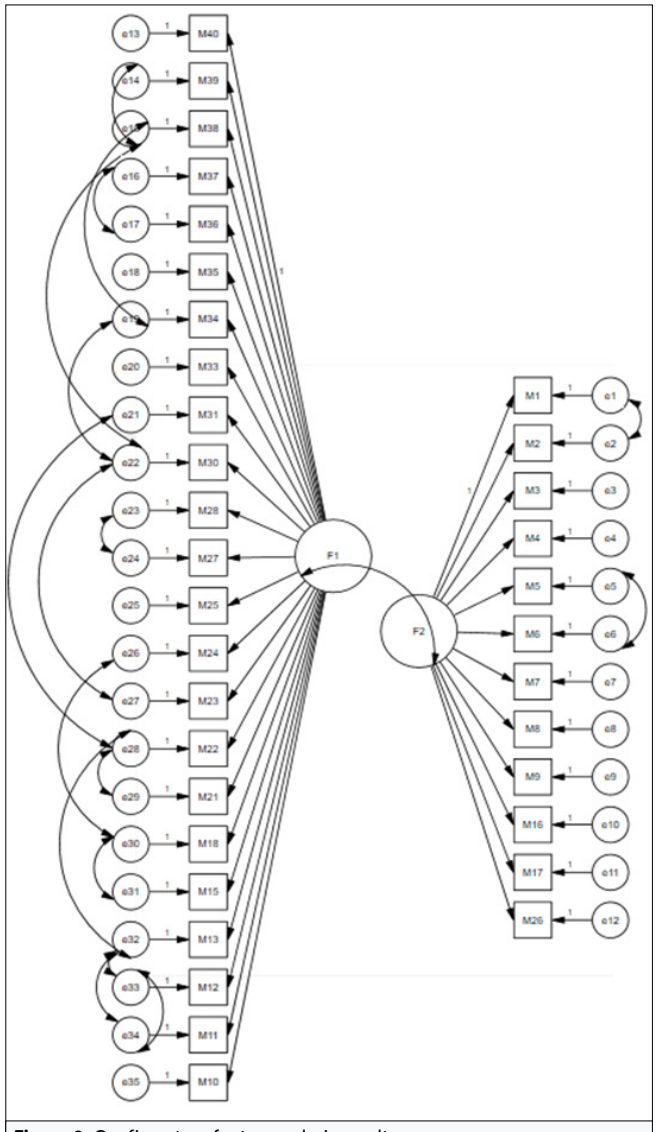

Figure 2. Confirmatory factor analysis results

Table 6. Results and the comparisons of CoV-PSY-CP scores

Variables	Variables'subheadings	CoV-PSY-CPfactor 1		CoV-PSY-CPfactor 2		CoV-PSY-CPtotal	
		Mean±SD	*P*	Mean±SD	*P*	Mean±SD	*P*
Parent filled the scale	Mother	20.4±6.6	0.427	32.9±10.6	0.213	53.3±16.3	0.251
	Father	20.1±7.4		31.5±9.9		51.6±16.4	
Socioeconomic status	Low	21.6±7.0	<0.001	34.8±11.4	<0.001	56.3±17.5	<0.001
	Middle-High	19.2±6.4		30.5±9.0		49.7±14.4	
Gender of the children	Girl	20.6±7.2	0.791	32.7±10.7	0.854	53.3±16.9	0.943
	Boy	20.2±6.4		32.5±10.3		52.7±15.8	
		Correlation coefficient	*P*	Correlation coefficient	*P*	Correlation coefficient	*P*
Parental age		0.022	0.643	-0.070	0.139	-0.027	0.571
Child's age		0.165	<0.001	0.048	0.313	0.110	0.021

CoV-PSY-CP:Coronavirus-related Psychiatric Symptom Scale in Children - Parental Form

Discussion

In this study, a scale was developed for evaluating the psychiatric symptoms perceived by parents in their children related to the COVID-19 pandemic. Because it is not easy for pediatricians and mental health professionals working with children and adolescents to collect data directly from the child or adolescent during the pandemic period, it was deemed more appropriate to make an assessment through the parents who were reached. For this purpose, scale items were created first and validity studies were carried out thereafter.

Validity is defined as the degree to which a measurement tool can accurately measure the property it aims to measure without confusing it with any other feature (15). Factor analysis was applied to examine the construct validity of CoV-PSY-CP. It is a construct validity technique used to reveal whether there is a certain order among participants' responses to the items in the measurement tool being developed (16). During the scale development process, the answers given to the items are scored, and factor analysis is applied. According to the results, the analysis is repeated after the items are removed or added to the measure. This process pursued until a suitable solution is reached that includes a sufficient number of items to measure the issue to be measured (17,18). After the factor analysis in our study, two items with low correlation and factor load and items with a difference <0.10 in at least two factors were removed from the scale, and the number of items decreased to 35. As a result of factor analysis, our variables were grouped under two factors.

Confirmatory factor analysis, one of the applications of the structural equation model, is used to test whether there is a sufficient level of relationship between factors, which variables are associated with which factors, whether the factors are independent of each other, and whether the factors are sufficient to explain the model (19). Fit is called the ability of a model to reproduce data, namely variance-covariance matrix. Various fit statistics were used in this study. The findings showed that the Cmin/df, RMSEA, and RMR results of the two-factor structure are within the acceptable range, and the CFI, IFI, and TLI results were found to be close to the acceptable range (20-22). Based on all these data, it can be concluded that the analysis conducted in our study indicates a good fit for the scale, but the findings need to be repeated in further studies with larger samples.

One of the factors affecting the power of analysis and the precision of the results in factor analysis is the sample size (23). It is stated that there should be at least 10 participants for each parameter to be estimated (24). The power of EFA to be made with large samples will greatly increase with items that have high factor loadings and high common variance (25). In our study, the data obtained from 441 individual were evaluated, and the sampling adequacy measure calculated by the KMO test was appropriate (KMO=0.964).The KMO test is used as a fitness test that tries to test the correlations between variables and the suitability of factor analysis. The test value varies between 0 and 1. The KMO value is 1 if the value of a variable was guessed by other variables without error. It is stated that the KMO value >0.90 is perfect (26). In our research, KMO value can be interpreted as excellent. According to the KMO value, it is seen that the measurements obtained from the scale are suitable for the analysis of principal components, and the significant Bartlett sphere city test showed that the data obtained have a normal distribution feature in this study (27).

The first factor in the measurement tool is named as anxiety symptoms and consists of 12 items. The second factor is named as depressive symptoms and consists of 23 items. If the difference between the first factor and the second factor is more than two times, it shows that the scale is one dimensional, that is, it has construct validity. It can be accepted that the developed scale has the quality to measure the abstract psychological structure expressed as part of the psychiatric symptoms associated with COVID-19in children perceived by their parents.

In this study, both the CoV-PSY-CP anxiety and depression subscale scores were significantly higher in the cases with low socioeconomic status. The association of socioeconomic status with internalizing symptoms such as depression and anxiety in children is reported in the literature previously (28, 29). The results obtained with CoV-PSY-CP are compatible with previous findings.

There was a positive correlation between child's age and CoV-PSY-CP anxiety and depression subscale scores and CoV-PSY-CP total score. Chen et al. (7) reported higher percentages of depression and anxiety in adolescents than in children aged 6-8 years and those aged 9-12 years in their study population. Higher social needs in adolescence and the restrictions during the pandemic may have caused higher depressive and anxiety symptoms in adolescents.

The children and adolescents' anxiety and depressive symptoms were positively correlated with the parents' GHQ scores. This shows that the psychiatric symptoms in children and adolescents perceived by their parents have an association with the parental symptoms.

In our study, a test-retest method was used to calculate the reliability coefficient. Considering the dynamics of the pandemic process, the retest period was determined to be 14 days. In our study, the test-retest correlation of the scale was calculated as 0.988. This shows that the reliability of the scale is high (17).

The Cronbach alpha coefficient of the measuring tool was calculated as 0.966 in the study. The very high Cronbach alpha coefficient indicates that there is a very high level of agreement between the items in the measurement tool (17).

There was no parallel scale in our study, but the GHQ, which evaluates the psychological state of the parent who made the assessment, was also applied. It was observed that the scores obtained from the GHQ were significantly correlated with all the factors of CoV-PSY-CP and the total score.

The lack of face-to-face interviews and the inability to diagnose clinical depression and anxiety are limitations of this study. However, in the current situation, CoV-PSY-CP can be used as a screening tool and could help detect which child or adolescent should be referred to the child and adolescent psychiatry clinics. Another limitation is the absence of cut-off points of the

subscales and the total scale. Owing to the isolation situation during the pandemic, clinical diagnosis and self-report scales could not be applied. Thus, calculating the cut-off points could be an issue of further studies that are conducted in the clinical samples.

Conclusion

CoV-PSY-CP is a useful tool that can be used to detect psychiatric symptoms of children and adolescents who are at home during the COVID-19 pandemic period. The findings in this study reveal that CoV-PSY-CP is a valid and reliable tool for measuring the psychiatric symptoms associated with COVID-19 perceived by parents in their children.

Ethical Committee Approval: Ethical committee approval was received from the Ethics Committee of Hacettepe University (2020/10-47).

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

Peer-review: Externally peer-reviewed.

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Appendix

Dear parents,

Unfortunately, we are faced with a pandemic that can only happen once in a century, globally. Below are some questions to understand your child's reactions after learning about the coronavirus outbreak. By reading the items, you can mark the score that best suits your child. In this way, field experts will be informed about the reactions that most occur in children against this pandemic and will be able to develop appropriate approaches to these reactions.

Kind regards

		NEVER	RARELY	OFTEN	ALWAYS
1.	My child is more restless since hearing about the coronavirus.	(1)	(2)	(3)	(4)
2.	My child has been asking more questions about whether he/she's safe since hearing about the coronavirus.	(1)	(2)	(3)	(4)
3	My child is more nervous than before, since he/she heard about the coronavirus.	(1)	(2)	(3)	(4)
4	My child has been experiencing more regret since hearing about the coronavirus.	(1)	(2)	(3)	(4)
5.	Since my child heard about the coronavirus, he/she is depressed.	(1)	(2)	(3)	(4)
6	Since my child heard about the coronavirus, he/she seems sadder than before.	(1)	(2)	(3)	(4)
7	My child is worried about what will happen to him/her since he/she heard about the coronavirus.	(1)	(2)	(3)	(4)
8.	My child has been complaining of more tiredness since hearing about the coronavirus.	(1)	(2)	(3)	(4)
9	Since my child has heard of the coronavirus, he/she is anxious most of the time.	(1)	(2)	(3)	(4)
10.	My child has had more self-esteem issues since hearing about the coronavirus.	(1)	(2)	(3)	(4)
11.	My child is angrier since he/she heard about the coronavirus.	(1)	(2)	(3)	(4)
12	My child has more frequent outbursts of anger since he/she heard about the coronavirus.	(1)	(2)	(3)	(4)
13	My child cries quicker since he/she heard about the coronavirus.	(1)	(2)	(3)	(4)
14.	My child often complains of boredom since hearing about the coronavirus.	(1)	(2)	(3)	(4)
15.	My child gets vigilant more quickly since hearing about the coronavirus.	(1)	(2)	(3)	(4)
16	Since my child has heard about the coronavirus, he/she is worried most of the time.	(1)	(2)	(3)	(4)
17	Since my child heard about the corona virus, he/she is less happy than before when he/she does the things he/she loves.	(1)	(2)	(3)	(4)
18.	Since my child heard about the coronavirus, he/she wakes up more often at night.	(1)	(2)	(3)	(4)
19.	My child wakes up earlier in the morning than before, since he/she heard about the coronavirus.	(1)	(2)	(3)	(4)
20.	Since my child heard about the coronavirus, he/she is more worried about not being able to do his/her work, activities related to lessons correctly.	(1)	(2)	(3)	(4)
21.	Since my child heard about the coronavirus, nothing makes him/her happy.	(1)	(2)	(3)	(4)
22	My child has been doing mischief that he/she has never done since hearing about the coronavirus.	(1)	(2)	(3)	(4)
23.	Since my child heard about the coronavirus, he/she has been worried that something bad will happen to his/her loved ones.	(1)	(2)	(3)	(4)
24.	Since my child heard about the coronavirus, he/she does not want to participate in activities we do as a family.	(1)	(2)	(3)	(4)
25.	My child has been experiencing more indecision since hearing about the coronavirus.	(1)	(2)	(3)	(4)
26.	Since my child hears about the coronavirus, he/she has more difficulty in doing her lessons than before.	(1)	(2)	(3)	(4)
27.	My child has been more reluctant to eat since hearing about the coronavirus.	(1)	(2)	(3)	(4)
28.	My child started to complain of pain and aches more frequently since he/she heard about the coronavirus.	(1)	(2)	(3)	(4)
29.	Since my child heard about the coronavirus, he/she has been more reluctant to participate in lecture-related activities.	(1)	(2)	(3)	(4)
30.	Since my child heard about the coronavirus, he/she does not want to talk to his/her friends, even on the phone.	(1)	(2)	(3)	(4)
31.	Since my child heard about the coronavirus, he/she thinks he/she is more unsuccessful than other children.	(1)	(2)	(3)	(4)
32.	Since my child heard about the coronavirus, he/she thinks he/she has not been loved by us.	(1)	(2)	(3)	(4)
33.	Since my child heard about the coronavirus, he/she has not been doing the tasks given at home.	(1)	(2)	(3)	(4)
34.	My child has been fighting with those around his/her more often since he/she heard about the coronavirus.	(1)	(2)	(3)	(4)
35.	Since my child heard about the coronavirus, his/her body-focused repetitive behavior has increased (nail biting, finger sucking, scab removal, tics, etc.).	(1)	(2)	(3)	(4)

*The validity and reliability study was not conducted with the English version of the scale. If you have any questions, please contact shesapcioglu@ybu.edu.tr.

Sevgili anne-babalar,

Maalesef dünya olarak yüzyılda bir olabilecek bir pandemic ile karşı karşıyayız. Aşağıda, çocuğunuzun koronavirüs salgınını öğrendikten sonra verdiği tepkileri öğrenmek amacıyla bazı sorular yer almaktadır. Maddeleri okuyarak sizin çocuğunuza en fazla uyan puanı işaretleyebilirsiniz. Böylelikle alan uzmanları bu pandemi karşısında çocuklarda en fazla ortaya çıkan tepkiler konusunda bilgi sahibi olacak, bu tepkilere uygun yaklaşımlar geliştirebileceklerdir.

Saygı ve sevgiler

		HİÇ	BİRAZ	ÇOK	TAMAMEN
1.	Çocuğum korona virüsü duyduğundan beri daha huzursuz.	(1)	(2)	(3)	(4)
2.	Çocuğum korona virüsü duyduğundan beri güvende olup olmadığı ile ilgili daha fazla soru soruyor.	(1)	(2)	(3)	(4)
3	Çocuğum korona virüsü duyduğundan beri öncesine göre daha gergin	(1)	(2)	(3)	(4)
4	Çocuğum korona virüsü duyduğundan beri daha fazla pişmanlık yaşıyor.	(1)	(2)	(3)	(4)
5.	Çocuğum korona virüsü duyduğundan beri hiç keyfi yok.	(1)	(2)	(3)	(4)
6	Çocuğum koronavirüsü duyduğundan beri öncesine göre daha üzgün görünüyor.	(1)	(2)	(3)	(4)
7	Çocuğum korona virüsü duyduğundan beri başına geleceklerden endişe ediyor.	(1)	(2)	(3)	(4)
8.	Çocuğum korona virüsü duyduğundan beri daha fazla yorgunluktan yakınır oldu.	(1)	(2)	(3)	(4)
9	Çocuğum korona virüsü duyduğundan beri çoğu zaman kaygılı.	(1)	(2)	(3)	(4)
10.	Çocuğum korona virüsü duyduğundan beri daha fazla kendine güven sorunu yaşıyor.	(1)	(2)	(3)	(4)
11.	Çocuğum korona virüsü duyduğundan beri daha sinirli.	(1)	(2)	(3)	(4)
12	Çocuğum korona virüsü duyduğundan beri daha sık öfke patlamaları yaşıyor.	(1)	(2)	(3)	(4)
13	Çocuğum korona virüsü duyduğundan beri daha çabuk ağlıyor.	(1)	(2)	(3)	(4)
14.	Çocuğum korona virüsü duyduğundan beri sık can sıkıntısından yakınıyor.	(1)	(2)	(3)	(4)
15.	Çocuğum koronavirüsü duyduğundan beri daha çabuk heyecanlanıyor.	(1)	(2)	(3)	(4)
16	Çocuğum korona virüsü duyduğundan beri çoğu zaman endişeli.	(1)	(2)	(3)	(4)
17	Çocuğum korona virüsü duyduğundan beri sevdiği şeyleri yaparken eskisine oranla daha az mutlu olabiliyor.	(1)	(2)	(3)	(4)
18.	Çocuğum korona virüsü duyduğundan beri geceleri daha sık uyanıyor.	(1)	(2)	(3)	(4)
19.	Çocuğum korona virüsü duyduğundan beri öncesine göre sabahları daha erken uyanıyor.	(1)	(2)	(3)	(4)
20.	Çocuğum korona virüsü duyduğundan beri işlerini, derslerle ilgili etkinlikleri doğru yapamama konusunda daha fazla endişe yaşıyor.	(1)	(2)	(3)	(4)
21.	Çocuğum korona virüsü duyduğundan beri hiçbir şey onu mutlu etmiyor.	(1)	(2)	(3)	(4)
22	Çocuğum korona virüsü duyduğundan beri hiç yapmadığı yaramazlıkları yapıyor.	(1)	(2)	(3)	(4)
23.	Çocuğum korona virüsü duyduğundan beri sevdiklerine kötü bir şeyo lacakmış endişesi yaşıyor.	(1)	(2)	(3)	(4)
24.	Çocuğum korona virüsü duyduğundan beri ailece yaptığımız etkinliklere katılmak istemiyor.	(1)	(2)	(3)	(4)
25.	Çocuğum korona virüsü duyduğundan beri daha fazla kararsızlık yaşıyor.	(1)	(2)	(3)	(4)
26.	Çocuğum korona virüsü duyduğundan beri derslerini yapmakta eskisinden daha fazla zorlanıyor.	(1)	(2)	(3)	(4)
27.	Çocuğum korona virüsü duyduğundan beri yemek yemeye daha isteksiz oldu.	(1)	(2)	(3)	(4)
28.	Çocuğum korona virüsü duyduğundan beri daha sık ağrı ve sızılardan yakınmaya başladı.	(1)	(2)	(3)	(4)
29.	Çocuğum korona virüsü duyduğundan beri derslerle ilgili aktivitelere katılmakta daha fazla isteksiz oldu.	(1)	(2)	(3)	(4)
30.	Çocuğum korona virüsü duyduğundan beri arkadaşları ile telefonla bile olsa görüşmek istemiyor.	(1)	(2)	(3)	(4)
31.	Çocuğum korona virüsü duyduğundan beri kendisini diğer çocuklardan daha başarısız görüyor.	(1)	(2)	(3)	(4)
32.	Çocuğum korona virüsü duyduğundan beri bizim tarafımızdan sevilmediğini düşünüyor.	(1)	(2)	(3)	(4)
33.	Çocuğum korona virüsü duyduğundan beri evde verilen görevleri yapmıyor.	(1)	(2)	(3)	(4)
34.	Çocuğum korona virüsü duyduğundan beri çevresindekilerle daha sık kavga ediyor.	(1)	(2)	(3)	(4)
35.	Çocuğum korona virüsü duyduğundan beri vücut odaklı tekrarlayıcı davranışları arttı (tırnakyeme, parmak emme, yara kabuğunu kaldırma, tikler).	(1)	(2)	(3)	(4)