Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

Acta Psychologica 229 (2022) 103705

Contents lists available at ScienceDirect

Acta Psychologica

journal homepage: www.elsevier.com/locate/actpsy

Psychometric properties and clinical utility of COVID-19-related distress scale among children and adolescents with Disabilities

Mohammed R. Alzahrani

Departmental of Psychology, Faculty of Education, Umm Al-Qura University, Al-Abidiyah, Makkah, Saudi Arabia

ARTICLE INFO

Keywords:
Development
Reliability
Factorial validity
COVID-19-related distress

ABSTRACT

Background: The aim was to estimate the psychometric properties of the COVID-19-related distress scale in our society, as well as verifying the global structure of the COVID-19-related distress scale through exploratory factor analysis and the confirmatory factor analysis model for the dimensions prepared in the light of previous studies and the general factor model.

Methods: The study follows the design of the exploratory cross-sectional studies by applying a scale electronically using the Google Forms tool. Construct validity was evaluated using confirmatory factor analysis, exploratory factor analysis, and content validity. Pearson product-moment correlation, Cronbach's alpha reliability coefficient, and test-retest methods were used to evaluate reliability.

Results: In the analysis made for internal consistency in the reliability study of the scale, the Cronbach's alpha reliability coefficients were determined as $\alpha = 0.93$ for the physical dimension subscale, 0.90 for the psychological and emotional dimension, 0.92 for cognitive dimension, 0.91 for the social dimension, 0.92 for behavioral dimension, 0.87 for living Dimension and 0.94 for the whole scale. The total number of items on the scale is 62. It is clear that the items of the scale explained 55.49 % of the variance of the correlation matrix between the items, which indicates that the scale has an appropriate degree to extract the variance that explains COVID-19-related distress. The fit indices were found to be Chi square = 862.30 ($p < .001$), degree of freedom = 210 ($\chi 2 = 862.30$; df = 210, $\chi 2/df = 4.10$), root mean square error of approximation (RMSEA) = 0.07 ($p < .05$) standardized root mean- square residual (SRMR) = 0.05, comparative fit index (CFI) = 0.92, non-normed fit index (NNFI) = 0.95, goodness of fit index (GFI) = 0.95, and adjusted goodness of fit index (AGFI) = 0.94.

Conclusions: The COVID-19-related distress scale is an easy to administer, valid, and reliable instrument to assess COVID-19-related distress. This instrument can be a helpful tool informing us about distress related to COVID-19 and hence may prevent adverse long-term consequences arising due to pandemic.

1. Introduction

COVID-19 has become an important and urgent threat to global health. Since a cluster of cases of idiopathic pneumonia was reported in Wuhan, China in December 2019, transmission of COVID-19 has continued to spread, and on January 30, 2020, the WHO declared the outbreak a public health emergency of international concern later, despite different public health responses. With the aim of slowing the spread of COVID-19, many countries have faced a serious health crisis. As of early September 2020, 25 million cases have been identified and over 800,000 deaths have occurred. As various treatments are practiced and researched, the impact of COVID-19 is expected to continue (Altun et al., 2021; Artan et al., 2021).

The epidemic has caused stressful and psychologically disturbing life events, during which the individual is exposed to sleep disturbances, disturbing nightmares, various fears, eating disorders, loss of appetite, or significantly and uncontrollable increase, as well as feelings of helplessness, guilt, frustration, loss, depression and tendency to isolation. A very important role in influencing social aspects and losing the desire to communicate and interact with others, as well as sudden, unpredictable or controlling behaviors such as anger, crying and distraction, in addition to aggressive behaviors with friends and family, and not only that, but panic attacks can accompany convulsive attacks that lead to epilepsy(Fares et al., 2021).

Amid the COVID-19 crisis, children and adolescents (e.g. Attention-Deficit/Hyperactivity Disorder (ADHD), Dyslexia, Autism spectrum disorder, learning disabilities, and students with mild intellectual disabilities in inclusion classrooms)with special needs may have

E-mail address: mrzahrani@uqu.edu.sa.

https://doi.org/10.1016/j.actpsy.2022.103705
Received 8 April 2022; Received in revised form 6 August 2022; Accepted 7 August 2022
Available online 10 August 2022
0001-6918/© 2022 The Author. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

challenges. The greater burden faced by children living with disabilities means that additional efforts will be required to ensure their needs are being met when transitioning to the different pandemic phases(Unicef, 2021). According to the results of Mete Yesil et al. (2022) COVID-19 negatively affected the families at a rate of 94.6 %; 76.5 % of the children's daily routines were worsened. Overall activity durations (25.7 %) decreased. Special education practices at home were ceased by 17.2 % of families, and a significant difference was found between the groups with and without regression in development in terms of the frequency of continuing special education at home.

Regarding the psychological effects of the Corona pandemic, in Saudi society, Alkhamees et al. (2020) indicated that 23.6 % reported feeling moderate to severe psychological impact from the Corona pandemic, 28.3 %, 24 % and 22.3 % admitted moderate to severe symptoms of depression, anxiety and stress, respectively. In 194 cities in China, Wang et al. (2020), 58.8 % admitted that the negative psychological effects of the Corona pandemic ranged from moderate to severe, 16.5 % of the respondents reported suffering from moderate to severe depressive symptoms, and 28.8 % admitted that they had moderate to severe levels of anxiety symptoms, and 8.1 % admitted that they had moderate to severe levels of depression.While Zhang and Ma (2020) concluded that 52.1 % of the participants in the study in Liaoning Province, China, experienced fear, terror and panic as a result of the pandemic, and the sample showed low levels of stress, and that 57.8 % to 77.9 % of individuals received social support from Friends and family members. In the Spanish community, Rodriguez et al. (2020) found that 36 % of participants reported moderate to severe psychological effects, 25 % showed mild to severe levels of anxiety, 41 % showed depressive symptoms and 41 % felt with pressure.

1.1. Significance

In light of the rapid developments of this pandemic, the study aimed to develop a scale to measure COVID-19-related distress particularly for this study, indicating its psychometric properties. The study also aimed to identify the gender differences in fear of the Corona pandemic.

Exploratory factor analysis is one of the most important statistical methods that provide us with a solid ground for constructing psychological measures, as it aims to determine the number of factors for construction, and that is the distribution of items over the factors to give a construct of psychological meaning. The final integrated for the concept because it was designed to maximize the amount of variance within the set of variables that measure the concept and that the following analyzes with another set of data do not result in the same factor structures. It also presents criticisms of the exploratory factor analysis because it gives components to build on statistical bases and not in the light of a theory that determines the structure of the scale degrees and also does not have the ability to deal with measurement errors (Henson et al., 2004), while the confirmatory factor analysis aims to ascertain the extent Matching the exploratory factor construct to the sample data or an assumed theoretical construct with its dimensions in the light of a psychological theory.

Hence the importance of the study problem, which is the need for an accurate measurement tool to diagnose and determine the levels of COVID-19-related distress, and it has good psychometric properties, and the characteristics of objective measurement are available. Also, most of the measurement tools that were built to measure COVID-19-related distress were procedures for verifying its psychometric properties according to the traditional theory of measurement. As well as estimating the psychometric properties of structural validity in the light of the exploratory and confirmatory factor analysis, as well as estimating the internal stability of Cronbach's alpha for the dimensions of the scale.

1.2. Purpose

The aim was to estimate the psychometric properties of the COVID-19-related distress scale in our society, as well as verifying the global structure of the COVID-19-related distress scale through Exploratory factor(EF) analysis and the confirmatory factor(CF) analysis model for the dimensions prepared in the light of previous studies and the general factor model.

2. Method and procedure

2.1. Design

The study follows the design of the exploratory cross-sectional studies by applying a scale electronically using the Google Forms tool.

2.2. Participants

Criteria for inclusion were:a) students with disabilities in inclusion classrooms b)of both gender, and c) electronic written informed consent is to be signed electronically. Also, participants were assured about anonymity, confidentiality, voluntary participation and withdrawal. Since it is recommended to determine the sample size to include 5–10 people for each scale item in scale studies (Çapık et al., 2018), the number of participants selected was 476, which was 7 times the number of scale items (68 items).

3. Data analysis

After data collection and unloading, statistical processing was carried out using the statistical package for social sciences Spss (26), to estimate Cronbach's alpha coefficient for estimating the internal consistency of dimensions and EF analysis. To estimate the reliability of internal consistency using Cronbach's alpha for 68 items of the scale, it was taken into account that the reliability of the dimension items is not <0.60. Exploratory factor analysis was conducted using the method of principal components and promax to detect the factorial structure of the items of the scale with determining the number of factors with six factors because the presence of factors more than that has no psychological explanatory meaning. We relied on the criterion that the value of the latent root is >1.0 with the logical and theoretical explanation of the factors resulting from the analysis to determine the number of factors. An item was considered saturated by the factor if the saturation size was >0.30. The program LISREL (8.8) was used to perform the confirmatory factor analysis of the confirmatory factor analysis model of the six-factor model, and it was used:

1. Estimation method: The CF analysis model for the hypothetical construction of COVID-19-related distress was verified using the maximum likelihood method.

2. Goodness of fit indices: The program gives many conformance indicators, the most important of which are square χ^2, TLI index (NNFI), CFI index, and residual indexes RMSEA and SRMR. The researcher relied on the criteria reached by Hu and Bentler (1999) to determine the appropriate and good fit, which is for the CFI and NNFI matching indicators. Good is >0.95 and acceptable or appropriate is from 0.90 to 0.94, for the RMSEA indicators 0.05 to 0.08 are suitable and <0.05 is good, and for the RMR and SRMR indicators a value of <0.08 indicates a good fit, and the value is in the range 0.09 to 0.10 It indicates an acceptable fit, and for χ^2 if it is not a statistical function, the model is identical with the data, and if it is a function, the model does not fit (Stone, 2021).

Descriptive statistics (Table 1) were employed to analyze the basic characteristics of the items (mean, standard deviation, minimum, maximum, skewness and kurtosis).

Table 1
Descriptive statistics of the items of the COVID-19-related distress scale.

Items	N	Min	Max	Mean	SD	Skewness	Kurtosis
1	438	1	5	2.34	1.20	1.48	4.92
2	438	1	5	2.11	1.11	0.76	2.71
3	438	1	5	2.13	1.31	1.16	3.42
4	438	1	5	3.01	1.00	1.22	3.64
5	438	1	5	2.11	1.23	1.31	3.77
6	438	1	5	2.19	1.29	1.66	5.51
7	438	1	5	2.11	1.03	1.24	3.68
8	438	1	5	2.16	1.07	1.33	3.80
9	438	1	5	2.10	1.00	1.48	4.92
10	438	1	5	2.19	1.39	0.76	2.71
11	438	1	5	2.13	1.28	1.31	3.77
12	438	1	5	2.32	1.04	1.66	5.51
13	438	1	5	2.11	1.22	1.24	3.68
14	438	1	5	2.12	1.01	2.03	8.16
15	438	1	5	2.18	1.20	0.76	2.71
16	438	1	5	2.25	1.29	2.00	7.89
17	438	1	5	2.01	1.08	1.24	3.68
18	438	1	5	2.19	1.02	2.03	8.16
19	438	1	5	2.43	1.03	0.76	2.71
20	438	1	5	2.17	1.06	2.00	7.89
21	438	1	5	2.28	1.25	1.66	5.51
22	438	1	5	2.15	1.26	1.24	3.68
23	438	1	5	2.55	1.29	1.33	3.80
24	438	1	5	2.29	1.20	1.48	4.92
25	438	1	5	2.21	1.32	0.60	1.05
26	438	1	5	2.16	1.92	2.03	8.16
27	438	1	5	2.12	1.24	0.76	2.71
28	438	1	5	2.15	1.22	2.43	5.38
29	438	1	5	2.10	1.54	1.22	3.64
30	438	1	5	2.43	1.61	1.31	3.77
31	438	1	5	3.26	1.08	1.66	5.51
32	438	1	5	2.34	1.02	1.24	3.68
33	438	1	5	2.29	1.00	1.33	3.80
34	438	1	5	2.20	1.14	1.48	4.92
35	438	1	5	2.16	1.12	0.60	1.05
36	438	1	5	2.19	1.31	2.03	8.16
37	438	1	5	2.15	1.81	0.76	2.71
38	438	1	5	2.08	1.02	0.60	1.05
39	438	1	5	2.19	1.18	2.03	8.16
40	438	1	5	2.44	1.22	0.76	2.71
41	438	1	5	2.43	1.06	2.43	5.38
42	438	1	5	2.46	1.30	1.48	4.92
43	438	1	5	2.33	1.02	0.76	2.71
44	438	1	5	2.22	1.24	1.16	3.42
45	438	1	5	2.13	1.32	1.22	3.64
46	438	1	5	2.17	1.72	1.31	3.77
47	438	1	5	2.16	1.25	1.48	4.92
48	438	1	5	2.18	1.31	1.48	4.92
49	438	1	5	2.25	1.06	0.76	2.71
50	438	1	5	2.03	1.02	1.16	3.42
51	438	1	5	2.19	1.00	1.22	3.64
52	438	1	5	2.09	1.01	1.31	3.77
53	438	1	5	2.20	1.21	1.48	4.92
54	438	1	5	2.18	1.22	1.66	1.77
55	438	1	5	2.25	1.25	1.31	3.77
56	438	1	5	2.22	1.31	1.48	4.92
57	438	1	5	2.19	1.21	1.66	1.77
58	438	1	5	2.37	1.12	1.18	1.43
59	438	1	5	2.20	1.16	1.65	1.70
60	438	1	5	2.18	1.32	1.18	1.43
61	438	1	5	2.77	1.07	1.66	1.77
62	438	1	5	2.03	1.18	1.18	1.43
63	438	1	5	2.51	1.28	1.65	1.70
64	438	1	5	2.39	1.02	1.18	1.43
65	438	1	5	2.26	1.20	1.33	3.80
66	438	1	5	2.44	1.22	1.48	4.92
67	438	1	5	2.51	1.07	0.76	2.71
68	438	1	5	2.19	1.88	1.44	3.80

4. Results

4.1. Reliability analysis

1) Item analysis

The item-total score correlations of the scale are given in Table 2. When the item-total score correlations of 36 items were examined for the reliability study of the scale, it was determined that the reliability coefficient varied between 0.54 and 0.90 and the correlation between item scores and total scale scores was positive and statistically significant ($p < .001$). When the item-subscale total score correlations of each subscale of the scale were examined, it was determined that the reliability coefficient of all items in physical dimension subscale ranged between $r = 0.54$ and 0.80, psychological and emotional dimension subscale ranged between $r = 0.55$ and 0.82, Cognitive dimension subscale ranged between $r = 0.54$ and 0.87, social dimension subscale ranged between $r = 0.54$ and 0.87, Behavioral dimension subscale ranged between $r = 0.54$ and 0.87, Living Dimension subscale ranged between $r = 0.54$ and 0.68, and the correlation coefficients of all items were positive and statistically significant ($p < .001$) (Table 2).

2) Reliability coefficient of internal consistency

In the analysis made for internal consistency in the reliability study of the scale, the Cronbach's alpha reliability coefficients were determined as $\alpha = 0.93$ for the physical dimension subscale, 0.90 for the psychological and emotional dimension, 0.92 for cognitive dimension, 0.91 for the social dimension, 0.92 for behavioral dimension, 0.87 for living Dimension and 0.94 for the whole scale.

3) Test-retest reliability and measurement error of COVID-19-related distress scale.

Table 3 shows the test–retest reliability of the six Dimensions of the COVID-19-related distress scale. The ICCs for the six Dimensions of the COVID-19-related distress scale between the two assessments ranged from 0.79 to 0.81.

4.2. Validity analysis

The content validity of the scale was determined and is stated in the data collection and procedure section.

1) Exploratory factor analysis

Exploratory factor analysis of the dimensions of the scale was carried out using the method of basic components and the Promax oblique rotation, due to the presence of relationships between the dimensions. If the value of the potential root is one or more to determine the number of factors and consider the value of eigenvalue 0.30 for the individual by the factor(Table 4). The Kaiser-Meyer-Olkin (KMO) test was conducted to determine the suitability of the data for factor analysis, and Bartlett's test was applied to determine the significance and zero difference between the variables to be analyzed. The KMO coefficient was found to be 0.87, the chi-square value for Bartlett's test was highly significant ($p < .001$), and the data were suitable and sufficient for the factor analysis.

It is clear from Table 4. that the items of the dimension of physical symptoms showed clear differentiation and its items were loaded on one factor (the third), and the items of psychological and emotional factors was loaded on the sixth factor, except for two. Therefore, the total number of items on the scale is 62. From the table, it is clear that the items of the scale explained 55.49 % of the variance of the correlation matrix between the items, which indicates that the scale has an appropriate degree to extract the variance that explains COVID-19-related distress. But it is clear that there is a problem in the global construction with regard to the dimensions of the living situation and social symptoms, but a differentiation occurred in the dimensions of physical, cognitive, emotional and daily practices. Also, by looking at the table, we notice the presence of binary loadings for some items, which indicates that the structure of distress is a complex one.

2) Confirmatory factor analysis

CFA was conducted for testing item-factor structure of the scale. Maximum likelihood estimation through AMOS 24 program was conducted. As a result of the six-factor CFA, the fit indices were found to be Chi square = 862.30 ($p < .001$), degree of freedom = 210 ($\chi 2 = 862.30$; df = 210, $\chi 2/df = 4.10$), root mean square error of approximation

Table 2
COVID-19-related distress subscales item-subscale total score correlations.

Subscales and items	Item-subscale total score correlation coefficients		Item-total score correlation coefficients		Cronbach's α
	r	P	r	P	
The physical dimension: to what extent do you agree that the following symptoms are present in a person infected with the Corona virus, according to medical reports?					
Item 1	0.68	<0.001	0.62	<0.001	0.93
Item 2	0.56	<0.001	0.51	<0.001	
Item 3	0.60	<0.001	0.55	<0.001	
Item 4	0.61	<0.001	0.56	<0.001	
Item 5	0.54	<0.001	0.49	<0.001	
Item 6	0.55	<0.001	0.49	<0.001	
Item 7	0.60	<0.001	0.55	<0.001	
Item 8	0.68	<0.001	0.62	<0.001	
Item 9	0.80	<0.001	0.76	<0.001	
Item 10	0.61	<0.001	0.56	<0.001	
Item 11	0.60	<0.001	0.55	<0.001	
Item 12	0.68	<0.001	0.62	<0.001	
Item 13	0.90	<0.001	0.84	<0.001	
The psychological and emotional dimension: to what extent do you agree with the presence of the following symptoms in a person infected with the Corona virus, according to medical reports?					
Item 14	0.80	<0.001	0.76	<0.001	0.90
Item 15	0.78	<0.001	0.73	<0.001	
Item 16	0.76	<0.001	0.70	<0.001	
Item 17	0.55	<0.001	0.49	<0.001	
Item 18	0.60	<0.001	0.55	<0.001	
Item 19	0.68	<0.001	0.62	<0.001	
Item 20	0.68	<0.001	0.62	<0.001	
Item 21	0.82	<0.001	0.74	<0.001	
Item 22	0.76	<0.001	0.70	<0.001	
Item 23	0.55	<0.001	0.49	<0.001	
Item 24	0.60	<0.001	0.55	<0.001	
Item 25	0.76	<0.001	0.70	<0.001	
Cognitive dimension: to what extent do you agree with the presence of the following symptoms when infected with the Corona virus?					
Item 26	0.83	<0.001	0.75	<0.001	0.92
Item 27	0.55	<0.001	0.49	<0.001	
Item 28	0.60	<0.001	0.55	<0.001	
Item 29	0.76	<0.001	0.70	<0.001	
Item 30	0.60	<0.001	0.55	<0.001	
Item 31	0.61	<0.001	0.56	<0.001	
Item 32	0.54	<0.001	0.49	<0.001	
Item 33	0.87	<0.001	0.81	<0.001	
Item 34	0.81	<0.001	0.73	<0.001	
The social dimension: to what extent do you agree with the practices when infected with the Corona virus?					
Item 35	0.76	<0.001	0.70	<0.001	0.91
Item 36	0.60	<0.001	0.55	<0.001	
Item 37	0.61	<0.001	0.56	<0.001	
Item 38	0.54	<0.001	0.49	<0.001	
Item 39	0.87	<0.001	0.81	<0.001	
Item 40	0.78	<0.001	0.73	<0.001	
Item 41	0.76	<0.001	0.70	<0.001	
Item 42	0.55	<0.001	0.49	<0.001	
Behavioral dimension: to what extent do you agree with the following practices during the Corona pandemic?					
Item 43	0.54	<0.001	0.49	<0.001	0.92
Item 44	0.87	<0.001	0.81	<0.001	
Item 45	0.81	<0.001	0.73	<0.001	
Item 46	0.54	<0.001	0.49	<0.001	
Item 47	0.87	<0.001	0.81	<0.001	
Item 48	0.81	<0.001	0.73	<0.001	
Item 49	0.54	<0.001	0.49	<0.001	
Item 50	0.87	<0.001	0.81	<0.001	
Item 51	0.60	<0.001	0.55	<0.001	
Item 52	0.76	<0.001	0.70	<0.001	
Item 53	0.60	<0.001	0.55	<0.001	
Item 54	0.60	<0.001	0.55	<0.001	
Item 55	0.76	<0.001	0.70	<0.001	
Living dimension: do you agree with the following practices during the Corona pandemic?					
Item 56	0.56	<0.001	0.51	<0.001	0.87
Item 57	0.60	<0.001	0.55	<0.001	
Item 58	0.61	<0.001	0.56	<0.001	
Item 59	0.54	<0.001	0.49	<0.001	
Item 60	0.55	<0.001	0.49	<0.001	
Item 61	0.60	<0.001	0.55	<0.001	
Item 62	0.68	<0.001	0.62	<0.001	
Item 63	0.56	<0.001	0.51	<0.001	
Item 64	0.60	<0.001	0.55	<0.001	
Item 65	0.61	<0.001	0.56	<0.001	
Item 66	0.60	<0.001	0.55	<0.001	
Item 67	0.61	<0.001	0.56	<0.001	
Item 68	0.54	<0.001	0.49	<0.001	

r = Pearson correlation test.

Table 3
Test–retest reliability of the COVID-19-related distress scale (raw scores).

Measure	1st Test M (SD)	2nd Test M (SD)	Difference M (SD)	ICC (95 % CI)	Heteroscedasticity (Pearson r)
PD	56.1 (5.2)	55.8 (4.5)	0.3 (1.7)	0.80	0.78
PED	50.3 (3.7)	49.3 (4.6)	1.00 (1.3)	0.82	0.73
CD	33.4 (2.5)	32.1 (2.0)	1.1 (1.7)	0.81	0.74
SD	31.8 (6.2)	30.8 (5.8)	1.00 (2.0)	0.81	0.75
BD	55.8 (3.2)	54.1 (3.5)	1.7 (3.7)	0.79	0.75
LD	43.3 (1.7)	42.3 (1.6)	1.00 (5.3)	0.81	0.76

Notes: PD = Physical Dimension, PED = Psychological and emotional Dimension, CD = Cognitive Dimension, SD = Social Dimension, BD- Behavioral Dimension, LD = Living Dimension, * = p-values < .05.

(RMSEA) = 0.07 ($p < .05$) standardized root mean- square residual (SRMR) = 0.05, comparative fit index (CFI) = 0.92, non-normed fit index (NNFI) = 0.95, goodness of fit index (GFI) = 0.95, and adjusted goodness of fit index (AGFI) = 0.94 (Table 5).

Fig. 1 shows a CFA diagram.

5. Discussion

The aim was to estimate the psychometric properties of the COVID-19-related distress scale in our society, as well as verifying the global structure of the COVID-19-related distress scale through Exploratory factor(EF) analysis and the confirmatory factor(CF)analysis model for the dimensions prepared in the light of previous studies and the general factor model. To date, no much attention has been given to assessing the psychometric properties of instruments designed to measure COVID-19-related distress, particularly in Arabic-speaking countries. In this respect, this study provides one of the first empirical evidence of reliability, and Factorial validity using classical test theory.

The scale has six dimensions(subscales): physical dimension(13 items), psychological and emotional dimension(12 items), cognitive dimension(9 items), social dimension(8 items), behavioral dimension

Table 4
EFA: factor loadings.

Item	F.1	F.2	F.3	F.4	F.5	F.6
Item 1			0.45			
Item 2			0.64			
Item 3			0.70			
Item 4			0.66			
Item 5			0.71			
Item 6			0.65			
Item 7			0.66			
Item 8			0.68			
Item 9			0.59			
Item 10			0.78			
Item 11			0.73			
Item 12			0.53			
Item 13					0.31	
Item 14						0.66
Item 15						0.61
Item 16		0.33				0.55
Item 17		0.55				0.41
Item 18		0.50				0.42
Item 19		0.64				0.48
Item 20		0.55				0.45
Item 21		0.74				
Item 22		0.58				
Item 23		0.84				
Item 24		0.85				
Item 25		0.79				
Item 26		0.88				
Item 27		0.81				
Item 28		0.64				
Item 29		0.55				
Item 30						0.61
Item 31						0.74
Item 32						0.58
Item 33						0.84
Item 34						0.85
Item 35					0.55	
Item 36					0.61	
Item 37	0.70					
Item 38	0.87					
Item 39	0.93					
Item 40	0.93					
Item 41	0.93					
Item 42	0.57					
Item 43	0.83					
Item 44	0.85					
Item 45	0.64					
Item 46	0.76					
Item 47	0.51			0.33		
Item 48	0.68			0.75		
Item 49	0.58			0.77		
Item 50						
Item 51						
Item 52						0.74
Item 53					0.31	
Item 54					0.60	
Item 55					0.60	
Item 56					0.66	
Item 57					0.36	
Item 58				0.38		
Item 59				0.39		
Item 60				0.42		
Item 61				0.74		
Item 62				0.66		
Item 63				0.76		
Item 64				0.61		
Item 65				0.67		
Item 66				0.65		
Item 67					0.39	
Item 68					0.42	

Variance explained by the factors (%)		Eigenvalue
F.1	29.88	18.82
F.2	11.71	7.38
F.3	4.45	2.80

(*continued on next page*)

Table 4 (*continued*)

F.4	4.16	2.62
F.5	3.13	1.97
F.6	2.16	1.36

Table 5
Model fit indices from measurement models of COVID-19-related distress scale.

Goodness of fit indexes	Measurement model of COVID-19-related distress scale
χ2, df	862.30
χ2/df	4.10
CFI	0.92
NNFI	0.95
GFI	0.95
AGFI	0.94
RMSEA	0.07
SRMR	0.05

(13 items), living dimension (13 items). The scale offers promise as tools for better understanding the distress associated with COVID-19. Other studies used other scales in the field, specifically Fear of COVID-19 Scale, in different countries and people, such as Japanese (Masuyama et al., 2022), Italian (Soraci et al. 2020), Bangla (Sakib et al., 2020), and Persian (Ahorsu et al., 2020). The contribution of the present study is that, to the best of my knowledge, this study is the first to develop and evaluate the Psychometric properties and clinical utility of COVID-19-related distress scale among children and adolescents with Disabilities in the Arabic speaking country; Egypt. Children and adolescents with Disabilities are psychologically vulnerable to the negative effects of the measures implemented to curb the pandemic, such as school closures, enhancing social distancing, and online learning.

This brings about the need to investigate how quarantine strategies affect adolescents' mental health (Masuyama et al., 2022), as well as to elaborate appropriate strategies, such as school-based psychoeducation and/or group psychotherapy, that would help adolescents cope with psychological issues caused by the pandemic. Accordingly, the development of a pandemic-specific measure such as the scale can serve to aid in identifying individuals at risk for adverse emotional reactions both during and post-pandemic.

Other studies developed a similar scale (e.g. Taylor et al., 2020). These authors identified stable 5-factor solution, corresponding to five scales assessing COVID-19 stress and anxiety symptoms: (1) COVID danger and contamination fears, (2) COVID fears about economic consequences, (3) COVID xenophobia, (4) COVID compulsive checking and reassurance seeking, and (5) COVID traumatic stress symptoms. The scales performed well on various indices of reliability and validity.

As a result of the Exploratory factor(EF) analysis conducted to determine the construct validity of the COVID-19-related distress scale, the items having factor loads of <0.40, and the items that were involved in more than one factor simultaneously and had the difference between loads in two factors below 0.20, were eliminated. The Kaiser-Meyer-Olkin (KMO) test was conducted to determine the suitability of the data for factor analysis, and Bartlett's test was applied to determine the significance and zero difference between the variables to be analyzed. The KMO coefficient was found to be 0.87, the chi-square value for Bartlett's test was highly significant ($p < .001$), and the data were suitable and sufficient for the factor analysis. The items of the dimension of physical symptoms showed clear differentiation and its items were loaded on one factor (the third), and the items of psychological and emotional factors was loaded on the sixth factor, except for two. Therefore, the total number of items on the scale is 62. From the table, it is clear that the items of the scale explained 55.49 % of the variance of the correlation matrix between the items, which indicates that the scale has an appropriate degree to extract the variance that explains COVID-19-related distress. it is clear that there is a problem in the global construction with regard to the dimensions of the living situation and social

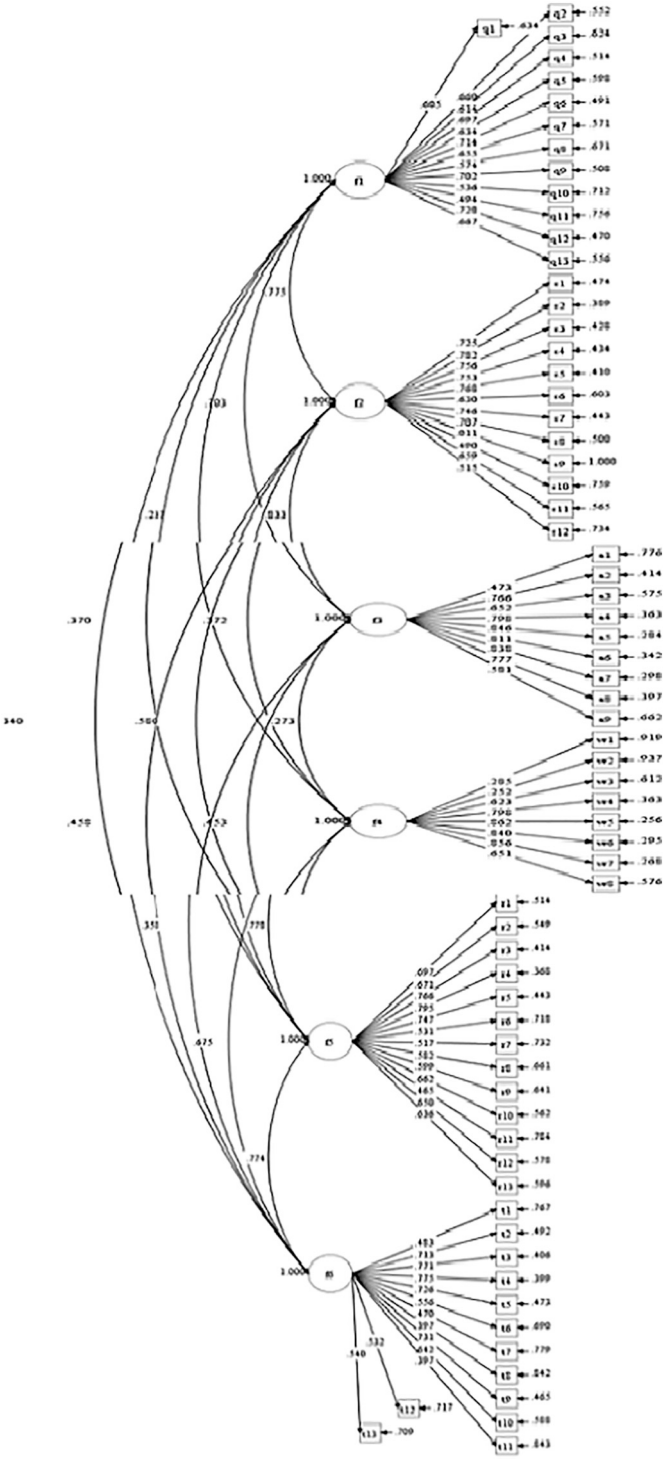

Fig. 1. COVID-19-related distress scale six-factor confirmatory factor analysis diagram.

symptoms, but a differentiation occurred in the dimensions of physical, cognitive, emotional and daily practices.

As a result of the six-factor confirmatory factor(CF), the fit indices

were found to be Chi square = 862.30 ($p < .001$), degree of freedom = 210 ($\chi2 = 862.30$; df = 210, $\chi2/df = 4.10$), root mean square error of approximation (RMSEA) = 0.07 ($p < .05$) standardized root mean- square residual (SRMR) = 0.05, comparative fit index (CFI) = 0.92, non-normed fit index (NNFI) = 0.95, goodness of fit index (GFI) = 0.95, and adjusted goodness of fit index (AGFI) = 0.94.

Taking into account the prolonged pandemic and harsh measures taken during the pandemic like lockdown, the negative effects of COVID-19 on students with disabilities is undeniable. The designed scale is recommended to be used for fields such as education and practice, and clinical studies on students' COVID-19 related knowledge about stress. It can be used in planning and policy making about psychological interventions and improve mental health of students and increase personal capacities.

6. Educational contributions to the current study

It is important to publish a study on a scale that assesses the COVID-19-related distress in our society, as well as other societies for several reasons. First, there is evidence that the current pandemic has caused severe consequences for people's mental health. With alarming rates of increase in cases of distress symptoms, strengthening fears about the future, and uncertainties common in periods of adversity that question people's stability and sense of security about their lives, correct and accurate tools are needed to assess life fluctuations in case of distress caused by the specific situation of the epidemic. Therefore, it is very important develop valid and reliable psychological tool to measure when individuals react to this situation. Second, the results of the COVID-19-related distress Scale may help support the development of public policies aimed at dealing directly with the promotion of psychological well-being, such as psychoeducational measures of a preventive nature, as well as to guide interventions in treating distress linked to COVID-19. Third, the COVID-19-related distress Scale differs from other scales by placing distress symptoms in a specific context by focusing on the COVID-19 pandemic as a particular source of distress. This takes as a basis for developing related items and behavioral episodes that generate distress symptoms, such as severe adverse situations, such as the COVID-19 pandemic.

7. Conclusions and future implications

The COVID-19-related distress scale is an easy to administer, valid, and reliable instrument to assess COVID-19-related distress. This instrument can be a helpful tool informing us about distress related to COVID-19 and hence may prevent adverse long-term consequences arising due to pandemic. It also may enable us to better understand and explore the sources of distress due to the pandemic. This mutating coronavirus has created an environment of uncertainty and continues to be a source of distress for all people around the world. Thus, due to the prevailing circumstances, the necessity of a scale to assess COVID-19-related distress holds significant value. Scales like COVID-19-related distress can also help guide the development of psychological instruments to deal with future pandemics.

8. Limitations

Like other studies, this one has a number of limitations. Firstly, data were gathered by self-report. As self-report instruments were used, social desirability bias affecting the findings could not be ruled out. However, previous studies on COVID-19-related scales have generally used self-report and the results have shown acceptable reliability and validity. A convenience sample was used that does not adequately represent the general population of Saudi Arabia. Therefore, it is necessary to have a more representative and diverse sample to compare and generalize the results.

Despite these limitations, the results of the study showed that the COVID-19-related distress scale has solid psychometric properties, based on classic statistical techniques, to be used in measuring COVID-19-related distress in the population of Saudi Arabia.

Disclosure statement

No potential conflict of interest was reported by the author.

Funding

The author received no direct funding for this research.

Declaration of competing interest

I declare no conflict of interest.

Appendix 1

1. COVID-19-related distress scale

Instructions

Below are a number of statements. You are kindly asked to read each statement well and then determine to what degree the statement applies to you while you are in the Corona virus pandemic, put a tick ($\surd$) in front of the estimate that applies to you.

N.	Statement	Highly applied to me	Applied to me	Neutral	Not applied to me	Applied to me at all
Physical symptoms: when I heard about the spread of the Corona virus, I felt the following physical symptoms and thought they were related to the disease						
1	Fast heart rate					
2	Breathing difficulties					
3	Tingling in feet and hands					
4	Intestinal disturbances (nausea, stomach pain or diarrhea).					
5	Pain and dryness in the throat.					
6	Unsteadiness and dizziness.					
7	Sweating, shivering and chills.					
8	High temperature;					
9	Headache					
10	Coughing					

(*continued on next page*)

(*continued*)

N.	Statement	Highly applied to me	Applied to me	Neutral	Not applied to me	Applied to me at all
11	Runny					
12	Disorders in my physical activities in general.					
13	Sleep problems and disturbances.					
	Psychological and emotional symptoms: when I heard about the spread of the Corona virus, I felt					
14	Anxiety.					
15	Stress.					
16	Agitation;					
17	Anger for the slightest reason.					
18	Depression.					
19	Extreme sadness from the current situation.					
20	Intense fear of everything and anything.					
21	Loneliness.					
22	Indifference to the simplicity of the Corona virus issue.					
23	Loss of trust in others					
24	The ability to control my emotions.					
25	Panic when someone sneezes next to me.					
	Cognitive symptoms: when I heard about the spread of the Corona virus, I felt the following symptoms					
26	Continuous thinking about the consequences of not controlling the spread of the Corona virus					
27	Suffering from poor concentration in whatever work I do, no matter how simple					
28	Frequent forgetting about important things.					
29	Suffering from frequent mental confusion					
30	Thoughts crowding into the brain.					
31	Ideas fly and move from one idea to another without the completion and maturity of any idea.					
32	Lacking of ability to solve the simplest problems of daily life.					
33	Refraining from engaging in cognitive activities such as reading.					
34	Not thinking of anything.					
	Social symptoms: when I heard about the spread of the Corona virus, I decided					
35	To communicate with family and friends by phone or via social networking sites only.					
36	To refrain from visiting family and neighbors.					
37	To refrain from shaking hands with others.					
38	To refrain from kissing others.					
39	Not participating in social and family meetings.					
40	To occupy my time with various social activities					
41	To lead my social life normally.					
42	To ask my family members not to visit their friends.					
	Behaviour symptoms: when I heard about the spread of the Corona virus, I was afraid of					
43	Using of public transportation.					
44	Going to the markets and stores.					
45	Being in crowded places.					
46	Going to work.					
47	High prices of food and disinfectants.					
48	The continuation of the crisis and food commodities may be running out of the house.					
49	My inability to treat myself or a member of my family In the event of the disease.					
50	Views of funerals and cremation of Corona dead in some countries.					
51	Increase in the number of injuries and deaths in the countries of the world.					
52	Increase in food intake too quickly.					
53	Not adhering to prevention and safety measures					
54	Isolation in quarantine places.					
55	Going to places of worship					
	Daily (living) practices: when I heard about the spread of the Corona virus, I did the following					
56	Cleaning the house with chlorine and disinfectants.					
57	Sterilizing the purchases before storing them constantly.					
58	Sterilizating (keys, mobile…) when any family member returns from outside the house.					
59	Forcing my family members not to leave the house under any circumstances.					
60	Buying supplements even though I don't need them.					
61	Purchasing and storing food commodities in excess of my needs.					
62	Committing to wearing gloves and sanitary masks, even while sleeping.					
63	Sanitizing my clothes - and my utensils from time to time.					
64	Excessive use of hand sanitizers for my family members.					
65	Repeating my temperature several times a day.					
66	Refraining from buying meals from restaurants.					
67						

(*continued on next page*)

(*continued*)

N.	Statement	Highly applied to me	Applied to me	Neutral	Not applied to me	Applied to me at all
	Refraining from using any toilets (bathrooms) outside my house, no matter how much I needed them.					
68	Buying and stocking several refills of medical alcohol and disinfectants in bulk.					

References

Ahorsu, D. K., Lin, C. Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). The fear of COVID-19 scale: Development and initial validation. *International Journal of Mental Health and Addiction*. https://doi.org/10.1007/s11469-020-00270-8

Alkhamees, A. A., Alrashed, S. A., Alzunaydi, A. A., Almohimeed, A. S., & Aljohani, M. S. (2020). The psychological impact of COVID-19 pandemic on the general population of Saudi Arabia. *Comprehensive Psychiatry, 102*, Article 152192.

Altun, T., Salih, A., Ahmet, G., & Caner, Ö. (2021). Investigating education faculty students' views about asynchronous distance education practices during Covid-19 isolation period. *Psycho-Educational Research Reviews, 10*(1), 34–45. https://www.journals.lapub.co.uk/index.php/perr/article/view/1710.

Artan, T., Meydan, S., & Irmak, H. S. (2021). Turkish version of the fear of COVID-19 scale: Validity and reliability study. *Archives of Health Science and Research, 8*(2), 117–123. https://doi.org/10.5152/ArcHealthSciRes.2021.20113, 2021.

Çapık, C., Gözüm, S., & Aksayan, S. (2018). Intercultural scale adaptation stages, language and culture adaptation: Updated guideline. *Florence Nightingale Journal of Nursing, 26*(3), 199–210. https://doi.org/10.26650/FNJN397481

Fares, Z. E. A., Al-Tammemi, A. B., & Gadelrab, H. F. (2021). Arabic COVID-19 psychological distress scale: Development and initial validation. *BMJ Open, 11*, Article e046006. https://doi.org/10.1136/bmjopen-2020-046006

Henson, R. K., Capraro, R. M., & Capraro, M. M. (2004). Reporting practices and use of exploratory factor analyses in educational research journals: Errors and explanation. *Research in the Schools, 11*(2), 61–72. https://doi.org/10.1177/0013164405282485

Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Masuyama, A., Shinkawa, H., & Kubo, T. (2022). Validation and psychometric properties of the japanese version of the fear of COVID-19 scale among adolescents. *Int J Ment Health Addiction, 20*, 387–397. https://doi.org/10.1007/s11469-020-00368-z

Mete Yesil, A., Sencan, B., Omercioglu, E., & Ozmert, E. N. (2022). The impact of the COVID-19 pandemic on children with special needs: A descriptive study. *Clinical Pediatrics (Phila), 61*(2), 141–149. https://doi.org/10.1177/00099228211050223

Rodríguez-Rey, R., Garrido-Hernansaiz, H., & Collado, S. (2020). Psychological Impact and Associated Factors During the Initial Stage of the Coronavirus (COVID-19) Pandemic Among the General Population in Spain. *Frontiers in Psychology, 23*(11), 1540. https://doi.org/10.3389/fpsyg.2020.01540

Sakib, N., Bhuiyan, A. I., Hossain, S., Al Mamun, F., Hosen, I., Abdullah, A. H., et al. (2020). Psychometric validation of the bangla fear of COVID-19 scale: Confirmatory factor analysis and rasch analysis. *International Journal of Mental Health and Addiction*. https://doi.org/10.1007/s11469-020-00289-x

Soraci, P., Ferrari, A., Abbiati, F. A., Del Fante, E., De Pace, R., Urso, A., et al. (2020). Validation and psychometric evaluation of the Italian version of the Fear of COVID-19 Scale. *International Journal of Mental Health and Addiction*, 1–10. https://doi.org/10.1007/s11469-020-00277-1

Stone, B. M. (2021). The ethical use of fit indices in structural equation modeling: Recommendations for psychologists. *Frontiers in Psychology, 12*, Article 783226. https://doi.org/10.3389/fpsyg.2021.783226

Taylor, S., Landry, C. A., Paluszek, M. M., Fergus, T. A., McKay, D., & Asmundson, G. J. G. (2020). Development and initial validation of the COVID stress scales. *Journal of Anxiety Disorders, 72*, Article 102232. https://doi.org/10.1016/j.janxdis.2020.102232

Unicef. (2021). Children with disabilities and COVID-19. https://data.unicef.org/topic/child-disability/covid-19/.

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., & Ho, C. S. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health, 17*, 1729. https://doi.org/10.3390/ijerph17051729. PMID: 32155789.

Zhang, Y., & Ma, Z. F. (2020). Impact of the COVID-19 pandemic on mental health and quality of life among local residents in Liaoning Province, China: A crosssectional study. *International Journal of Environmental Research and Public Health, 17*(7), 2381. https://doi.org/10.3390/ijerph17072381