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Indonesian Version of the Fear of COVID-19 Scale: Validity and Reliability

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Abstract

Background and Objective: The Fear of COVID-19 Scale (FCV-19S) is a seven-item uni-dimensional scale assessing the severity of COVID-19 concerns. A translation and validation of the FCV-19S in Bahasa Indonesia language was expedited in view of the worrying trends of COVID-19 in Indonesia as well as its psychological squeal.

Methods: Formal WHO forward and backward translation sequences were applied in translating the English FCV-19S into Bahasa Indonesia. Indonesian university participants were recruited *via* convenience sampling online using snowball methods. The reliability and validity of the Indonesian FCV-19S was psychometrically evaluated by applying confirmatory factor analysis and Rasch analysis in relation to sociodemographic variables and response to the depression, anxiety, and stress components of the Indonesian version of DASS-21. The sample consisted of 434 Indonesian participants.

Results: The Cronbach α value for the Indonesia FCV-19-I was 0.819 indicated very good internal reliability. The results of the confirmatory factor analysis showed that the uni-dimensional factor structure of the FCV19S fitted well with the data. The FCV-19-I was significantly correlated with anxiety (r= 0.705, p< 0.001) subscales of DASS-21. The FCV-19-I's properties tested using Rasch analysis were also satisfactory, although three items in FCV-19-I were not able to be tested.

Conclusion: Hence, the Indonesian FCV-19-I is valid and reliable, with robust psychometric properties from classical and modern psychometric methods. It can be a valuable and useful tool in identifying and responding to psychological distress caused by COVID-19.

Keywords: Indonesia, Fear of COVID-19, COVID-19, Rasch analysis, DASS-21

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Introduction

The Coronavirus Diseases 2019 (COVID-19) pandemic, first reported in China in December 2019, has resulted in high levels of displacement, worldwide psychological panic, and has had huge knock on effects on employment, people's livelihood, and the travel and aviation industry in general (Nicola, M. *et. al.*, 2020; Ho, C.S.H. *et. al.*, 2020). Despite South East Asia region reporting its first case back in January 2020, Indonesia as the largest country in the region only reported its first case on 2nd March 2020. Within a short space of time, COVID-19 spread to numerous provinces, with Jakarta as the epicenter. As of 8th June 2020, Indonesia recorded 32,033 total cases and 1,883 total deaths, translating to a mortality rate of 5.88%, ranking among the highest in the region. However, Indonesia also had one of the lowest coronavirus testing rates; only 36 in one million were tested as compared to Singapore which tested 6,666 people per million. Thus, the true number of cases in Indonesia has been underestimated. As part of its response, the Indonesian government implemented Pembatasan Sosial Berskala Besar (PSBB), a large-scale social distancing policy. However, the widespread infection and the social distancing policy are uncharted territory for most Indonesians, especially in quarantine situations e.g. university students (Mukhsam, M.H. *et. al.*, 2020; Salvaraji, L. *et. al.*, 2020). This appears to have resulted in numerous psychological consequences, including fear and stigma (Lin. C.Y. *et. al.*, 2020). The fear of contracting the infection has impacted many individuals as well as their families (Harper, C.A. *et. al.*, 2020).

It is crucial to forge methods of measuring distress that are quantitative in nature to allow more objective and focused assessment. This allows for better impact analysis, improving implementation of educational material or preventative management (Pakpour, A.H. *et. al.*, 2020). There are limited psychological scales available in Bahasa Indonesia, especially for fear of COVID-19 which is a new construct. A Persian and English Fear of COVID-19 scale (FCV-19) has been developed, which is a series of 7 questions scored on a 5-point Likert scale, proving to be a concise scale suitable for busy clinical settings (Ahorsu, D.K. *et. al.*, 2020). This scale has been translated and validated into multiple languages, including Arabic, Turkish, Russian, Bangladeshi, Italian and Malay (Alyami, M. *et. al.*, 2020; Satici, B. *et. al.*, 2020; Reznik, A. *et. al.*, 2020; Sakib, N. *et. al.*, 2020; Soraci, P. *et. al.*, 2020; Pang, N.T.P. *et. al.*, 2020). With high mortality and low detection rates in the Indonesian setting, it is imperative the FCV-19 be translated and validated into what is essentially the language of 200 million people, using rigorous statistical models.

Materials and methods

Ethical Approval

Ethical approval was obtained from the Universiti Malaysia Sabah Medical Research Ethics Committee & Universitas Nahdlatul Ulama Surabaya Medical Ethics Committee prior to commencement of this project. All participants were presented with participant information sheet in the first page of the Google Form and have the right to refuse to participate without penalty, shall they decline. All participants in this study provided informed consent.

Methodology

Standard WHO guidelines were employed for FCV-19 validation. First, two independent experts: one as a content expert who is familiar with COVID-19 and bilingual in English and Bahasa Indonesia; and one as a language expert who is more familiar with Bahasa Indonesia; forward translated the FCV-19 from English to Bahasa Indonesia. Then, two separate individuals serving as content and language experts respectively, who were blind to the original translation, translated the Bahasa Indonesia version back into English. The two versions were compared and analyzed for major inconsistencies, and a revised version was hence produced. The revision was pilot tested in 20 Bahasa Indonesia-speaking individuals. Once further inconsistencies and incongruence with the original English version were rectified, a final Bahasa Indonesia translation was then produced.

The validation study was performed in a few universities in Surabaya, Indonesia. Convenience sampling was employed, and snowball methods were used to recruit samples. Google Forms were used with incorporated consent forms, sociodemographic questionnaires and research instruments, due to the inherent limitations for face to face data collection caused by the Indonesian PSBB lockdown. Snowball recruitment was performed utilising student and staff mailing lists. A sample size of 400 was planned to be recruited to facilitate the use of factor analysis with classical test theory methods, as it was considered a fair sample size for the purpose of factor analysis (Voorhis C.R.W.V. *et. al.*, 2007). Each participant was given a questionnaire containing three sections to fill in as follows.

Sociodemographic Questionnaire:

This was a brief questionnaire requesting for age, gender, education level, current occupation, location where participant was staying during the pandemic and marital status.

Fear of COVID-19 scale

The English FCV-19 was administered concurrently with the fresh Bahasa Indonesia FCV-19-I. The English Fear of COVID-19 scale consists of seven items (e.g., "I cannot sleep because I am worried about getting coronavirus-19"), scored on a five-item Likert point response ranging from 1 (strongly disagree) to 5 (strongly agree). The possible scores range from 7 to 35. The higher the score, higher the level of fear of COVID-19 (Ahorsu, D.K. *et. al.*, 2020), the original English scale has good internal reliability (Cronbach alpha= 0.82) and test-retest reliability (ICC= 0.72), with satisfactory evaluations of other properties based on classical test theory and Rasch model analysis. The psychometric properties of the Bahasa Indonesia FCV-19-I are presented in the "Results" section.

DASS-21 scale

The DASS-21 (Lovibond, S.H. *et. al.*, 1995) is self-reported, assesses the level of emotional distress (depression, anxiety and stress). It consists of 21 items that capture information about three separate feels: depression (e.g., "I couldn't seem to experience positive feeling"), anxiety (e.g., "I was aware of dryness of my mouth") and stress (e.g., "I found it hard to wind down").

The 21 items were rated on a four-point Likert scale ranging from 0 (*did not apply to me at all over the last week*) to 3 (*applied to me very much or most of the time over the past week*), with higher scores corresponding to greater severity. In the current study, the Indonesian version of Depression, Anxiety and Stress Scale 21 (DASS-21) was used.

Data Analysis

To assess the validity and reliability of FCV-19-I, classical test theory (CTT) (Novick, M.R., 1966) and Rasch measurement theory (RMT) (Hobart, J., 2009) were concurrently employed. Subsequently, validity and reliability tests were divided into two levels; which are scale level (the analyses were done at scale level) and item level (the analyses were done at item level). For the scale level, the CCT's methods employed were internal consistency measure using Cronbach's alpha, McDonald's omega, greatest lower bound, test-retest reliability using Pearson correlation test (Bahasa Indonesia version versus English version), average variance extracted (AVE), composite reliability, standard error of measurement, concurrent validity (fear of COVID-19 scale versus depression scale, anxiety scale, and stress scale), while the RMT's methods used were item and person separation reliability, and item and person separation index. On the other hand, for the item level, the CTT's methods employed were item-item correlation and item-total correlation, while the RMT's methods used were infit and outfit mean square (MnSq) and differential item functioning (DIF) to test the measurement invariance across gender. IBM SPSS 24.0 was used to run the CTT, while the RMT was run using jMetrik 4.1.1. The McDonald's omega and the greatest lower bound were calculated using JAPS. The original version (*i.e.* English version) (Ahorsu, D.K. *et. al.*, 2020) and the Bahasa Indonesia version of the fear of COVID-19 is as presented in **Table 1**.

Table 1: The Original English Version the Bahasa Indonesia Version of the FCV-19

Item	The original English version	The Bahasa Indonesia version
Item 1	I am most afraid of COVID-19	Saya sangat takut terhadap Virus Corona (COVID-19)
Item 2	It makes me uncomfortable to think about COVID-19	Saya merasa tidak nyaman apabila memikirkan tentang virus corona (COVID-19)
Item 3	My hands become clammy when I think about COVID-19	Tangan saya berkeringat ketika memikirkan tentang virus corona (COVID-19)
Item 4	I am afraid of losing my life because of COVID-19	Saya takut kehilangan hidup saya dikarenakan terpapar oleh virus corona (COVID-19)
Item 5	When watching news and stories about Corona Viruses-19 on social media, I become nervous or anxious	Saya merasa gugup dan khawatir apabila saya mendengar tentang virus corona (COVID-19) melalui siaran berita dan media sosial
Item 6	I cannot sleep because I am worrying about getting COVID-19	Saya tidak bisa tidur nyenyak karena khawatir terinfeksi virus corona (COVID-19)
Item 7	My heart races or palpitates when I think about getting COVID-19	Jantung saya berdebar debar memikirkan tentang virus corona (COVID-19)

Results

The sociodemographic of the respondents are displayed in **Table 2**. The majority of the participants were single, of female gender, students rather than employed, and the highest education being high school. Half of the participants resided in Surabaya during the pandemic, while another half was outside Surabaya. The mean age of the participants was 26 years old. Skewness and kurtosis for all 7 items on the Indonesian Fear of COVID-19 scale was acceptable as in the range of -0.883 to 2.608, and -1.056 to 6.383 respectively.

Table 2: The respondents' background information (n= 434)

Background	Category	N	%	Mean
Age				26 years old
Age category	25 years and below	291	67.10%	
	More than 25 years old	143	32.90%	
Gender	Male	108	24.90%	
	Female	326	75.10%	
Education level	High school	275	63.40%	
	Diploma	20	4.60%	
	Bachelor degree	44	10.10%	
	Master degree	82	18.90%	
	Doctoral Degree	13	3.00%	
Job	Staff	26	6.00%	
	Educational Staff	13	3.00%	
	Lecturer	94	21.70%	
	Librarian/ Laboratory Assistant	11	2.50%	
	Student	290	66.80%	
City	Surabaya	217	50.00%	
	Others	217	50.00%	
Marital status	Single	321	74.00%	
	Married	113	26.00%	

From **Table 3**, it is noted that none of the participants selected 'strongly agree' option in item 3, 6 & 7. Otherwise, the results of the Pearson correlation coefficient show that almost all the inter-item correlation coefficients were higher than 0.3 (**Table 4**). This implies that the instrument has an acceptable validity (Cohen, J., 1992). Furthermore, there was only one corrected item-total correlation coefficient with a value of less than 0.5 (**Table 5**). This concurs with recommendations that in an empirical approach, as a rule of thumb, if the score of the item-to-total correlations is more than 0.50 and the inter-item correlations exceed 0.30, the construct validity is satisfied (John, P.R. *et. al.*, 1991).

Table 3: The respondent's choices

Item	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	Count	%	Count	%	Count	%	Count	%	Count	%
Item 1	22	5.10%	39	9.00%	106	24.40%	224	51.60%	43	9.90%
Item 2	110	25.30%	132	30.40%	99	22.80%	72	16.60%	21	4.80%
Item 3	281	64.70%	91	21.00%	59	13.60%	3	0.70%	0	0.00%
Item 4	53	12.20%	44	10.10%	89	20.50%	219	50.50%	29	6.70%
Item 5	206	47.50%	74	17.10%	113	26.00%	40	9.20%	1	0.20%
Item 6	199	45.90%	132	30.40%	90	20.70%	13	3.00%	0	0.00%
Item 7	366	84.30%	49	11.30%	18	4.10%	1	0.20%	0	0.00%

Table 4: The item-item correlation matrix (n= 434)

Item	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
Item 2	0.440**					
Item 3	0.286**	0.501**				
Item 4	0.618**	0.321**	0.319**			
Item 5	0.381**	0.546**	0.452**	0.444**		
Item 6	0.404**	0.489**	0.346**	0.430**	0.399**	
Item 7	0.122*	0.523**	0.536**	0.206**	0.398**	0.376**

Table 5: The corrected item-total correlation (n= 434)

Item	Corrected Item-Total Correlation	Item exclusion or retention
Item 1	0.565	Retained
Item 2	0.650	Retained
Item 3	0.550	Retained
Item 4	0.559	Retained
Item 5	0.622	Retained
Item 6	0.575	Retained
Item 7	0.489	Retained

All the psychometric measures' results as shown in **Table 6** have confirmed the validity and reliability of FCV-19-I as all the values have passed the suggested cut-off except for AVE. Additionally, at the item level, all the factor loadings were higher than 0.3 which means that the items are important (Pituch, K.A. *et. al.*, 2015) as presented in **Table 7**. All the communalities were also closer 1 except for Item 6 suggesting that extracted factor explains more of the variance of an individual item. The FCV-19-I's properties tested using Rasch analysis were also satisfactory where infit MnSq values were between 0.85 and 1.07, outfit MnSq values were between 0.85 and 1.12. These item fit statistics show that each item meets the unidimensional requirement of a Rasch model as all the values within 0.5-1.5 range (Wright, B.D. *et. al.*, 1994). The most difficult item was Item 5 (*i.e.* the highest value) and the easier item was Item 1 (*i.e.* the lowest value). There was also no substantial DIF found across gender since all the DIF contrast values were less than 0.5 (Shih, C.L., et. al., 2009).

Table 6: Psychometric properties for the Indonesia version of the fear of COVID-19 scale at the scale level (n= 434)

Psychometric method	Psychometric measure	Result	Suggested cut-off
CTT	Internal consistency measure using Cronbach's alpha	0.819	> 0.7
	Internal consistency measure using McDonald's omega	0.829	> 0.7
	Internal consistency measure using Greatest lower bound	0.882	> 0.7
	Test-retest reliability	0.997**	See Note
	Average variance extracted (AVE)	0.420	> 0.5
	Composite reliability	0.820	> 0.7
	Concurrent validity (Fear of COVID-19 scale versus Depression scale)	0.554**	See Note
	Concurrent validity (Fear of COVID-19 scale versus Anxiety scale)	0.705**	See Note
	Concurrent validity (Fear of COVID-19 scale versus Stress scale)	0.530**	See Note
RMT	Item separation reliability	0.997	> 0.7
	Item separation index	19.261	> 2
	Person separation reliability	0.811	> 0.7
	Person separation index	2.072	> 2

*Correlation is significant at the 0.05 level (two-tailed test);

** Correlation is significant at the 0.01 level (two-tailed test);

Note: Correlation coefficients of < 0.25 were considered as small; 0.25-0.50 as moderate; 0.50-0.75 as good; and > 0.75 as excellent
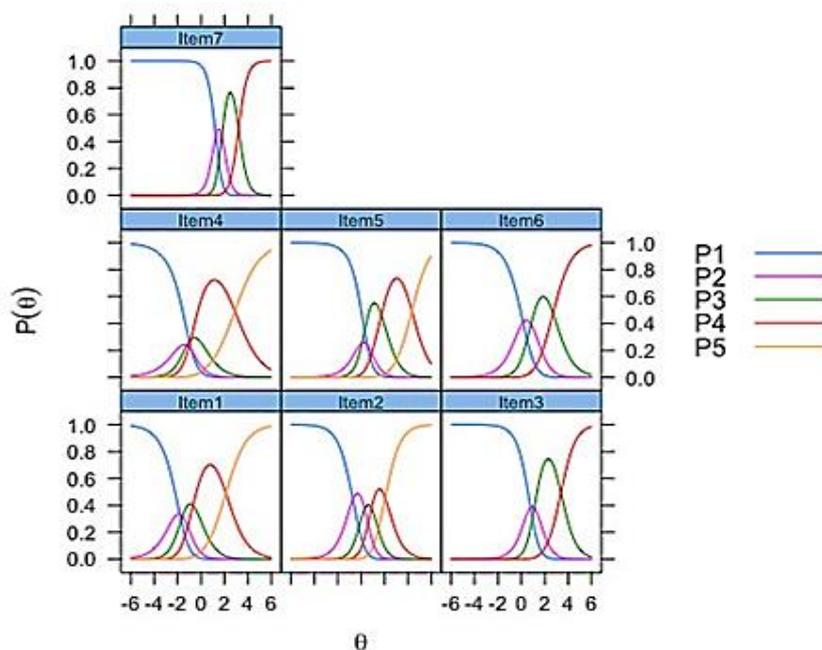

Figure 1: Item traces lines

Table 7: Psychometric properties of Indonesia version of the fear of COVID-19 scale at the item level (n= 434)

Item	Factor loading*	Communalities	Infit MnSq	Outfit MnSq	Difficulty	DIF contrast across gender[a,b]
Item 1	0.300	0.776	0.85	0.97	-1.65	-0.06
Item 2	0.789	0.663	1.07	1.12	0.44	-0.02
Item 3	0.789	0.622	----------------------------Dropped----------------------------			
Item 4	0.336	0.742	1.00	1.08	-0.89	0.20
Item 5	0.673	0.558	0.91	0.85	2.10	0.05
Item 6	0.577	0.499	----------------------------Dropped----------------------------			
Item 7	0.841	0.753	----------------------------Dropped----------------------------			

Item 3, 6 & 7 dropped due to unobserved categories mainly 'Strongly agree' as per Table 3; MnSq is mean square error, DIF is differential item functioning;

*Extraction method: Oblimin rotation with Kaiser Normalization;

[a]DIF contrast> 0.5 indicates substantial DIF;

[b]DIF contrast across gender = difficulty for males (reference group) - difficulty for females (focal group).

Positive values indicate items that are differentially easier for the focal group than the reference group.

Negative values indicate items that are differentially harder for the focal group than the reference group.

Confirmatory factor analysis result also showed acceptable fit, with GFI= 0.870, NFI= 0.791, CFI= 0.800, and SRMR= 0.088. GFI more than 0.85 indicates good fit (Anderson, J.C. *et. al.*, 1984), while NFI of 0.7-0.9 is considered as acceptable fit, with the ideal value is more than 0.9 (Fattah, S.M.A.E., 2010). CFI of 0.8-0.9 indicates acceptable fit, while CFI value of > 0.90 is accepted as good fit (Browne, M.W. *et. al.*, 1993). On the other hand, SRMR< 0.90 is considered as acceptable fit, with the value of < 0.80 considered as ideal fit (Hu, L.T. *et. al.*, 1999). In ultimate the correlation diagram for Item 1 to 7 have shown in **Figure 1** above.

Discussion

This study applied Rasch analysis in order to evaluate the psychometric characteristic of Fear of COVID-19 Scale (FCV-19) Indonesian version. However, as item 3, item 6 and item 7 had no 'strongly agree' response, Rasch analysis for the respective items were not able to be done. Nevertheless, the FCV-19-I demonstrates acceptable psychometric properties which render it valuable for use in assessing the brand new construct of COVID-19 related concerns and fears. With such psychometric properties, it can be used on a larger national scale in Indonesia to capture associations between fear and other related psychological process variables as part of larger studies exploring the psychological sequelae of COVID-19 on the Indonesian population.

The correlations with associated constructs in validated scales of similar language are noticeable in Anxiety subscale of the DASS, with correlations of .705. This suggests that more research needs to be performed to explore this finding further, as it is crucial to investigate how similar anxiety as encoded in the existing DSM-5 is to the construct of fear of COVID-19, as there are ultra-brief psychological interventions that can assist so (Pang, N.T.P. *et. al.*, 2020). The findings of these study mirror the Malay version of the Fear of COVID-19 Scale, which showed strong correlations with anxiety (Pang, N.T.P. *et. al.*, 2020); this means that relationships between behavioral explanations and anxiety are largely viable (Eugene K.B.Y. *et. al.*, 2020).

The main limitations are that this study used predominantly university staff and students in Surabaya. This is an unavoidable limitation as PSBB significantly restricts face to face collection of data for all psychometrics research, which has significantly constrained research work. Secondly, the sample size of 434 may not be sufficiently representative, due to difficulties in recruiting larger samples amid the restrictions; hence a sufficient number to perform factor analysis was recruited. Besides that, the content of item 3, item 6 and item 7 in the Bahasa Indonesia language may not yield polarized or strong answers in the language, as the translated version did not yield any 'strongly agree' responses. Apart from that, this study is also limited by difficulty in performing concurrent validity with other scales measuring anxiety, as there is no equivalent of a phobia scale validated into Indonesian. Lastly, there is also possibility of cross-language correlation which might affect the way participants answer the scales in both Bahasa Indonesia and English language. As this study was done at the height of COVID-19, there was urgent need to expedite the process to translate and validate the scale, so it can be further utilized in the bigger population.

Across multiple measures, it retains reasonable internal consistency, with Cronbach's alpha of 0.819, McDonald's omega of 0.829, and greatest lower bound of .882; acceptable construct validity based on the accepted score of the item-to-total correlations > 0.50 and the inter-item correlations > 0.30; good test-retest and composite reliability; good item separation reliability and item separation index based on Rasch analysis; reasonable concurrent validity based on reasonable correlations with the depression, anxiety, and stress components of the DASS-21; and Rasch analyses at the item level were deemed acceptable. When comparing with the existing validated instruments that are currently available, the single factor structure and good factor loadings for all items showed that the items are generally relevant.

Conclusion

In conclusion, this study proved that FCV-19-I is a psychometrically sound instrument, validated by classical and modern statistical approach. As Indonesia facing ongoing battle against COVID-19, it is hoped that this scale able to provide useful insight to psychological distress suffered by Indonesians; an aspect that might be overlooked in this testing times, and perhaps provide an impetus for a proper intervention much needed in the community. Further validation study in a more representative sample is recommended.

Conflict of Interest

All authors declared no conflict of interest. No funding received.

Ethical Approval

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5).

Consent

Informed consent was obtained from all participants for being included in the study.

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