





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

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### Abstract

The newly developed Persian Fear of COVID-19 Scale (FCV-19S) is a seven-item uni-dimensional scale that assesses the severity of fear of COVID-19. A translation and validation of the FCV-19S in the Malay language was expedited due to the severe psychological sequelae of COVID-19 in Malaysia. Formal WHO forward and backward translation sequences were employed in translating the English version into Malay. Malaysian university participants were recruited via convenience sampling online using snowball methods. The reliability and validity properties of the Malay FCV-19S were rigorously psychometrically evaluated (utilising both confirmatory factor analysis and Rasch analysis) in relation to socio-demographic variables and response to the depression, anxiety and stress subscales of the Malay validation of the DASS-21. The sample comprised 228 Malaysian participants. The Cronbach  $\alpha$  value for the Malay FCV-19S was 0.893 indicating 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-19S-M was significantly correlated with anxiety ( $r=0.481$ ,  $p<0.001$ ) and stress ( $r=0.389$ ,  $p<0.001$ ) subscales of DASS-21. The FCV-19S-M's properties tested using Rasch analysis were also satisfactory. Hence, the Malay FCV-19S is valid and reliable, with robust psychometric properties from classical and modern psychometric methods. It therefore is a highly crucial and timely addition to the psychological toolkit both in operational and research settings in identifying, managing and responding to the psychological distress engendered by COVID-19.

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The COVID-19 pandemic first emerged in December 2019 in China, involving a multitude of symptoms both respiratory and non-respiratory in nature (Rothan and Byrareddy 2020), leading to the World Health Organization declaring a public health emergency of immediate concern (Wu and McGoogan 2020). Malaysia initially moved from alert phase to containment phase in March 2020 when large numbers of undetected cases from a mass gathering cluster emerged (Reuters 2020). Hence, the Malaysian government proactively implemented a Movement Control Order (MCO) to flatten the epidemiological curve (Ashley 2020), lasting for three months, resulting in businesses shuttering and wide-ranging university student lockdowns on their respective campuses. The abrupt and decisive nature of this prolonged lockdown, the wide-ranging repercussions on the national economy and business sectors, and the economic difficulties that have ensued, have no doubt resulted in multiple psychological reactions amongst an unprepared public, including fear and stigma (Lin 2020). However, above all is the very clear and present fear of contracting COVID-19 itself, which supersedes many of these more situational fears (Harper et al. 2020), leading individuals nationwide to gladly concur with lockdown inconveniences due to the more overwhelming fear of illness. Early Malaysian studies focused on theoretical examinations of the psychological sequelae of COVID-19 including stigma and hoarding (Yau et al. 2020), and descriptions of brief interventions to alleviate frontliners' anxiety and worries (Pang et al. 2020). However, higher impact quantitative studies in the Malaysian setting that can better assess levels of COVID-19 related fear in the population, or assess the efficacy of any intervention performed, is hampered by the fact that only generic depression, anxiety and psychological distress scales in general are currently available to researchers in Malay validated versions. These generic scales do not take into account the unique structure of the fear prevalent in society with respect to COVID-19, which can be described as akin to a phobia, with components of physical and psychological sequelae of anxiety, and also an element of the unavoidable or unpredictable. This fear needs to be measured quantitatively if it is to inform any education or prevention programmes (Pakpour and Griffiths 2020).

As a consequence of these limitations with existing generic psychopathology scales, a Fear of COVID-19 scale (FCV-19S) has been developed (Ahorsu et al. 2020), compressing these concerns in an easy and swift to administer seven-item scale, rendering it suitable for busy clinical settings and the rigours of social distancing (Ahorsu et al. 2020). It has undergone rigorous psychometric testing and has been successfully validated into multiple languages, surviving the same level of statistical rigour (Alyami et al. 2020; Bitan et al. 2020; Reznik et al. 2020; Sakib et al. 2020; Satici et al. 2020; Soraci et al. 2020).

Hence, in response to the unique psychological needs in the Malaysian setting, it was decided to swiftly translate the FCV-19S into the Malay language (FCV-19S-M) and validate it with equally rigorous statistical models.

## Methods

### Ethics

Ethical approval was obtained from the Universiti Malaysia Sabah Medical Research Ethics Committee prior to commencement of this project. All participants provided informed consent.

## Methodology

The translation was prepared according to standard WHO guidelines. First, two independent researchers, one familiar with COVID-19 and bilingual in English and Malay as a content expert, and one more familiar with the Malay language as a language expert forward translated it from English to Malay. Subsequently, two different researchers, one content and one language expert, blind to the original translation, back translated the Malay version into English. The two versions were compared and scrutinised for major inconsistencies, and a harmonised version was hence produced. The harmonised translation was pilot tested in 20 Malay-speaking individuals, and any further inconsistencies, unusual turns in phrase, and incongruency with the original English version rectified, and a final Malay translation was then produced.

The validation study was performed in a university population in Borneo, Malaysia. Respondents were recruited through convenience sampling via a snowball method. Owing to strict quarantine measures and social distancing regulations, a face to face data collection was not feasible, hence a Google Form was utilised with the consent form, sociodemographic questionnaire and both research scales in-built. Snowball recruitment was performed utilising student and staff mailing lists. A sample size of 200 was planned to be recruited, a factor analysis with classical test theory methods was to be utilised, and it was considered as a fair sample size for the purpose of factor analysis (Wilson Von Voorhis & Morgan 2007). Each participant was given a questionnaire containing three sections to fill in as follows.

**Sociodemographic Questionnaire** This was a simple questionnaire requesting gender, education level, city the participant was currently living in during COVID-19, and marital status.

**Fear of COVID-19 Scale** The English version (Ahorsu et al. 2020) and the newly translated final Malay version were administered. The Persian 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), and has English and Persian original versions. The possible scores range from 7 to 35. The higher the score, the higher the level of fear of COVID-19 (Ahorsu et al. 2020). The original Persian scale has good internal reliability (Cronbach alpha = .82) and test-retest reliability (ICC = .72), with satisfactory evaluations of other properties based on classical test theory and Rasch model analysis. The psychometric properties of the Malay FCV-19S are presented in the “Results” section.

**DASS-21 Scale** The DASS-21 (Lovibond and Lovibond 1995) is a self-report scale designed to measure the severity of emotional distress (depression, anxiety and stress). It contains 21 items measuring three different domains: depression (e.g. “I could not seem to experience any positive feeling at all”), anxiety (e.g. “I was aware of the dryness of my mouth”), and stress (e.g. “I found it hard to wind down”). Each item is 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*). Higher scores in each domain indicate greater severity of emotional distress in that domain. In this study, the Malay version of the DASS-21 (Musa and Fadzil 2007) was used to measure emotional distress in caregivers. The Malay validation demonstrated acceptable Cronbach’s alpha values of .84, .74 and .79, respectively, for depression, anxiety and stress, and in addition, it had good factor loading values for most items (.39 to .73) (Musa and Fadzil 2007).

## Data Analysis

Two psychometric methods were used to check the validity and reliability of the Malay version of the fear of COVID-19 scale, which are classical test theory (CTT) (Novick 1966) and Rasch measurement theory (RMT) (Hobart and Cano 2009). The validity and reliability tests were divided into two levels, 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 methods employed were internal consistency measure using Cronbach's alpha, McDonald's omega, greatest lower bound, test-retest reliability using Pearson correlation test (Malay version versus English version), average variance extracted (AVE), composite reliability, standard error of measurement and 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. For the item level, the CTT methods employed were item–item correlation and item–total correlation, while the RMT methods used were infit and outfit mean square (MnSq) and differential item functioning (DIF) to test the measurement invariance across gender. The CTT was run using IBM SPSS 24.0, 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 et al. 2020) and the Malay version of the fear of COVID-19 is as presented in Table 1.

## Results

The sociodemographic details of the respondents are displayed in Table 2. The majority of the participants were single, female students, with at least a bachelor's degree-level education, with the majority being students outside Kota Kinabalu, the city where the university is located. The mean age of the participants was 26 years old. Skewness and kurtosis for all seven items on the Malay Fear of COVID-19 scale was acceptable as per Table 3.

The results of the Pearson correlation coefficient show that all the inter-item correlation coefficients were higher than 0.3 (see Table 4). This implies that the instrument has an

**Table 1** The original English version (Ahorsu et al. 2020) and the Malay version of the FCV-19S

Item	The original English version	The Malay version
Item 1	I am most afraid of COVID-19	<i>Saya sangat takut terhadap COVID-19</i>
Item 2	It makes me uncomfortable to think about COVID-19	<i>Saya berasa tidak selesa memikirkan tentang COVID-19</i>
Item 3	My hands become clammy when I think about COVID-19	<i>Tangan saya terasa berpeluh jika memikirkan tentang COVID-19</i>
Item 4	I am afraid of losing my life because of COVID-19	<i>Saya takut kehilangan nyawa saya disebabkan oleh COVID-19</i>
Item 5	When watching news and stories about COVID-19 on social media, I become nervous or anxious	<i>Saya merasa gemuruh dan bimbang apabila saya mendengar tentang COVID-19 melalui siaran berita dan media sosial</i>
Item 6	I cannot sleep because I am worrying about getting COVID-19	<i>Saya tidak dapat tidur kerana risau dijangkiti COVID-19</i>
Item 7	My heart races or palpitates when I think about getting COVID-19	<i>Jantung saya berdebar debar memikirkan tentang COVID-19</i>

**Table 2** The respondents' background information ( $n = 228$ )

Background	Category	N	%	Mean
Age				26 years old
Age category	25 years and below	163	71.5%	
	More than 25 years old	65	28.5%	
Gender	Male	66	28.9%	
	Female	162	71.1%	
Education level	High school	22	9.6%	
	Diploma	61	26.8%	
	Bachelor degree	128	56.1%	
	Master degree	13	5.7%	
	Doctoral degree	4	1.8%	
City	Kota Kinabalu	80	35.1%	
	Others	148	64.9%	
Marital status	Single	182	79.8%	
	Married	44	19.3%	
	Divorced	2	0.9%	

acceptable validity (Cohen 1992). Furthermore, there was also no corrected item–total correlation coefficient with a value of less than 0.5 (see Table 5). Robinson et al. (1991) recommend that, in an empirical approach and 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.

All the psychometric measures' results, as shown in Table 6, have confirmed the validity and reliability of FCV-19S-M because all the values have passed the suggested cut-off except for AVE and the person separation index. Additionally, at the item level, all the factor loadings were higher than 0.3 which means that all the items are important (Pituch and Stevens 2016). All the communalities were also closer to 1, suggesting that extracted factor explains more of the variance of an individual item. The FCV-19S-M's properties tested using Rasch analysis were also satisfactory, where infit MnSq values were between 0.83 and 1.38, and outfit MnSq values were between 0.76 and 1.30. These item fit statistics show that each item meets the unidimensional requirement of a Rasch model as all the values within the 0.5–1.5 range (Wright and Linacre 1994). The most difficult item was Item 5, and the easiest item was Item 3. There was also no substantial DIF found across gender since all the DIF contrast values were less than 0.5 (Shih and Wang 2009) (Table 7).

**Table 3** Descriptive statistics of the Malay version of the fear of COVID-19 scale ( $n = 228$ )

Item	N	Minimum	Maximum	Mean	Std. deviation	Skewness	Kurtosis
Item 1	228	1	5	3.45	1.096	−0.302	−0.537
Item 2	228	1	5	3.19	1.155	−0.253	−0.631
Item 3	228	1	5	1.8	0.959	0.808	−0.494
Item 4	228	1	5	3.35	1.216	−0.3	−0.795
Item 5	228	1	5	2.8	1.203	−0.049	−0.939
Item 6	228	1	5	1.81	0.979	1.05	0.508
Item 7	228	1	5	1.96	1.055	0.874	0.068

**Table 4** The item–item correlation matrix ( $n = 228$ )

Item	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
Item 2	.649**					
Item 3	.356**	.408**				
Item 4	.694**	.602**	.359**			
Item 5	.627**	.633**	.465**	.687**		
Item 6	.402**	.422**	.690**	.434**	.539**	
Item 7	.420**	.480**	.693**	.485**	.601**	.799**

\*\*Correlation is significant at the 0.01 level (2-tailed)

## Discussion

The main aim of this study was to evaluate the psychometric characteristics of the FCV-19S based on modern psychometric evaluation methods, namely Rasch analysis. This study shows very good internal consistency, with three concurrent measures, namely a Cronbach's alpha of .893, McDonald's omega of .894 and greatest lower bound of .911; acceptable construct validity based on the accepted score of the item–total correlations  $>0.50$  and the inter-item correlations  $>0.30$ ; excellent test–retest and composite reliability; good item separation reliability and item separation index based on Rasch analysis; reasonable concurrent validity based on the correlations with the anxiety and stress component of the DASS-21; and Rasch analyses at the item level were also satisfactory. Compared with the existing validated instruments that are currently available, the single factor structure and good factor loadings for each of the seven items are mirrored in this study too, thus the validation of the FCV-19S-M appears to be resonant with the results of the Turkish and Italian studies (Satici et al. 2020; Soraci et al. 2020).

Based on the results of the analysis, the seven-item FCV-19S-M appears to have acceptable statistical and psychometric properties and is hence suitable to be used for large scale epidemiological studies, randomised experimental design studies for psychological interventions and, most importantly, for operational purposes in the public and private sector to detect the presence of such cognitions of fear in the Malaysian population. The reasonable correlations with associated constructs in validated scales of the same language is especially relevant for the anxiety subscale of the DASS, with correlations of .481, because the FCV-19S has questions that largely mirror the psychological construct of a phobia, which falls into the American Psychiatric Association Diagnostic and Statistical Manual 5th edition category of anxiety disorders (American Psychiatric Association 2013).

**Table 5** The corrected item–total correlation ( $n = 228$ )

Item	Corrected item–total correlation	Item exclusion or retention
Item 1	0.678	Retained
Item 2	0.682	Retained
Item 3	0.608	Retained
Item 4	0.701	Retained
Item 5	0.768	Retained
Item 6	0.682	Retained
Item 7	0.727	Retained

**Table 6** Psychometric properties for the Malay version of the fear of COVID-19 scale at the scale level ( $n = 228$ )

Psychometric method	Psychometric measure	Result	Suggested cut-off
CTT	Internal consistency measure using Cronbach's alpha	0.893	> 0.7
	Internal consistency measure using McDonald's omega	0.894	> 0.7
	Internal consistency measure using greatest lower bound	0.911	> 0.7
	Test-retest reliability	0.971**	See Note
	Average variance extracted (AVE)	0.411	> 0.5
	Composite reliability	0.799	> 0.7
	Concurrent validity (fear of COVID-19 scale versus depression scale)	0.344**	See Note
	Concurrent validity (fear of COVID-19 scale versus anxiety scale)	0.481**	See Note
RMT	Concurrent validity (fear of COVID-19 scale versus stress scale)	0.389**	See Note
	Item separation reliability	0.983	> 0.7
	Item separation index	7.560	> 2
	Person separation reliability	0.745	> 0.7
	Person separation index	1.703	> 2

\*\*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

These findings correlate with established behavioural theorisations of fear. Anxiety can be constructed as the body's alert response to fear of the unknown and erroneous perception of danger leading to conditioned responses (De Masi 2004). Studies demonstrate clearly that there are corresponding physiological changes that occur when an individual is feeling anxiety or worry (Hoehn-Saric and McLeod 2000). The sympathetic nervous system, i.e. the body's "fight or flight" response activates and thus leads individuals to feel a constellation of physical symptoms in anxiety, including palpitations, increased heartbeat, stomach discomfort and subjective shortness of breath (Esler et al. 2006). No doubt, these are then coupled with psychological sequelae that originate

**Table 7** Psychometric properties of Malay version of the fear of COVID-19 scale at the item level ( $n = 228$ )

Item	Factor loading*	Communalities	Infit MnSq	Outfit MnSq	Difficulty	DIF contrast across gender <sup>ab</sup>
Item 1	0.865	0.778	0.87	0.89	-0.62	-0.07
Item 2	0.792	0.698	0.84	0.81	-0.44	-0.20
Item 3	0.196	0.773	1.38	1.30	0.99	-0.11
Item 4	0.845	0.766	0.83	0.76	-0.68	-0.19
Item 5	0.753	0.740	0.90	0.85	-0.16	0.13
Item 6	0.265	0.839	1.10	1.05	0.55	-0.22
Item 7	0.332	0.845	1.07	1.02	0.36	-0.14

MnSq, mean square error; DIF, differential item functioning.

\*Extraction method: Oblimin rotation with Kaiser normalization

<sup>a</sup> DIF contrast >0.5 indicates substantial DIF

<sup>b</sup> 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

from negative cognitions, including catastrophising, magnification and selective abstraction (MacLeod et al. 1997), which lead individuals to ruminate about the uncertainties COVID-19 causes in them.

Hence, it is important that this study validates a scale into the Malay language. The main limitations are that this study used a predominantly university population, including undergraduates and staff. However, it was difficult to recruit participants that were truly representative of a wide spectrum of society due to social distancing and restrictions on movement for the general public. University students in Malaysia were largely locked down in their universities, and hence the sample size was easier to attain in university campuses; however, data collection remained hampered because it all had to be performed online. Secondly, in addition, the sample size of 228 may not be sufficiently representative, again due to difficulties in recruiting larger samples during a national lockdown as mentioned previously. However, a sufficient number to perform factor analysis according to the literature was recruited. Thirdly, this study is also limited by difficulty in performing concurrent validity with other scales measuring anxiety, because there is no equivalent of a phobia scale validated into other languages that can be administered. However, the DASS-21 has subscales for both anxiety and stress that adequately cover both the physical and psychological manifestations of fear that the FCV-19S-M measures.

## Conclusion

In conclusion, this study demonstrates clearly that the FCV-19S-M is a psychometrically sound instrument, using both classical and modern techniques to assess the scale's validity. It is hoped that this will fill the urgent gap in identifying, measuring, monitoring and researching the psychological distress secondary to COVID-19 that has been caused both by the illness, the fear and stigma engendered by the illness, and the multiple sequelae of the measures required to contain the spread of the illness, including quarantines, lockdowns and the overall reduction in human contact as a society at large.

## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**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).

**Informed Consent** Informed consent was obtained from all patients for being included in the study.

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