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Reliability and Validity of an Instrument to Evaluate Knowledge, Attitude and Practice towards Measures for Preventing the Spread of COVID-19 in Malaysia: A Pilot Study

Zairina A Rahman[1], Natasya Abdullah[1], Noor Dzuhaidah Osman[2], Muhammad Nizam Awang@Ali[2], Nur Syazana Umar[3]

[1]Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia (USIM)

[2]Faculty of Syariah and Law, Universiti Sains Islam Malaysia (USIM)

[3]Faculty of Nursing and Allied Health Sciences, Lincoln University College Malaysia

Zairina A Rahman
Corresponding Author
Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia
E-mail: drzairina@usim.edu.my

Abstract

Preventing the spread of COVID-19 is crucial in flattening the COVID-19 infection curve. General population control measures should emphasise on understanding the knowledge about the disease and importance of following regulations related to restriction on movement. The aim of this pilot study was to develop a valid, reliable and practical instrument on Knowledge, Attitude and Practice towards Measures for Preventing the Spread of COVID-19 in Malaysia. The instrument was developed based on a Knowledge, Attitude and Practice (KAP) conceptual framework. The instrument in the form of a questionnaire was distributed online to a sample of 40 adults. The initial questionnaires contained 16, 17 and 14 questions on knowledge, attitude and practices domains, respectively. The content validity was assessed by the experts. The reliability of the instrument was measured using internal consistency reliability, which was measured using

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alpha coefficient reliability of Cronbach Alpha. The analysis showed that the total Cronbach Alpha value for knowledge, attitude and practice were 0.93, 0.89 and 0.87 respectively. After one item dropped from the attitude domain, the findings of this pilot study show that the instrument is valid and reliable to be used in a further larger study. This study demonstrated that the three scales of knowledge, attitude and practice were reliable and valid for assessing the prevention of spread of COVID-19 in Malaysia, although further analysis are needed to improve especially on the knowledge scale due to the low level of difficulty.

Keywords*: reliability, validity, prevention-COVID-19*

1. Introduction

COVID-19 is the most devastating communicable disease written in worldwide history. The COVID-19 pandemic has led to economic, political, laws, psychological and social impact (Walker et al, 2020). Malaysia is still in a battle against COVID-19 as the numbers continue to increase day by day.

Preventing the spread of COVID-19 by determining public behavioural change is crucial in flattening the COVID-19 infection curve. General population control measures should emphasis on understanding the knowledge about the disease and the importance of following regulations related to restrictions on movement. Therefore, a study on knowledge, attitude and practice (KAP) towards measures of preventing the spread of COVID-19 is very essential in determining the knowledge about the disease and society's readiness to comply with the standard regulation and guidelines established by the government. The KAP study enables baseline information to develop further intervention and proper health promotion to mitigate the spread of disease (Shah et al, 2020). To make sure there are no bias in the upcoming results, the set of KAP questionnaires need to be reliable and valid.

Much has been published about KAP towards COVID-19. However, there were very limited studies on reliability and validity instrument to evaluate knowledge, attitude and practice towards prevention of the spread of COVID-19 specifically targeting on the aspects of legislative and public health. Therefore, the main purpose of this study was to develop and measure validity and reliability of the questionnaire on KAP towards measures for preventing the spread of COVID-19 among adults residing in Malaysia.

2. Materials and Methods

Study design

This pilot study used a cross-sectional design and aimed to validate the questionnaires for KAP towards the measures for preventing the spread of COVID-19 infection. Convenient sampling method was used to get the respondents and survey was conducted via online Google form among adults residing in Malaysia. Based on sample size calculation for the actual field study, by using OpenEpi software, required sample size were 380 with 95% confidence interval and considering 30% attrition rate. For this pilot study about 10% from the actual field study sample size was used as the formula to recruit respondents for pilot study (40 respondents were selected).

All the respondents included in this study gave written informed consent before participating in the study via the online form. The response rate was 100%. It took around 15 minutes to complete all the questions.

Literature search

The questionnaire development started with the process of literature searches via journal databases namely Science Direct, Scopus, PubMed, Cochrane database and Medline. Keywords used were "COVID-19", "prevention of COVID-19", "KAP towards movement control order (MCO)" and "KAP towards preventing the spread of COVID-19".

Questionnaire development

Initial questionnaire was developed in English. The questionnaire was translated to a Bahasa Malaysia version using back-to-back translation by a translator who speaks fluently in both English and Bahasa Malaysia. Repeated discussions were carried out between the translator and the researchers in order to ensure the accuracy of the questionnaire.

The online questionnaire was developed and adapted based on the previous study (Zhong et al, 2020; Wise et al, 2020). The questionnaire development involved four expert panels with two of them being experts in public health field and another two experts in laws and legislation.

The initial questionnaire consisted of 47 questions divided into four sections: Section A was on socio-demographic data. Section B consisted of 16 questions regarding knowledge towards measures for preventing the spread of COVID-19 with three given options ("Yes", "No" and "Don't know"). One mark was given for correct answer while zero mark was given for incorrect and "don't know" answers. Item difficulty analysis was conducted on the knowledge domain. Section C consisted of 17 questions to evaluate attitude of the respondents with five given options using a 5-point Likert scale ("Strongly Disagree", "Disagree", "Neutral", "Agree" and "Strongly Agree"). Marks ranging from one to five were given depending on the positive statements while reverse scoring was given for the negative statement. Lastly, section D consisted of 14 questions regarding practice towards measures for COVID-19 with five different frequency options ("Always", "Most of the time", "Sometimes", "Rarely" and "Never"). Five marks were given for the answer "Always", four marks for "Most of the time", three marks for "Sometimes", two marks for "Rarely" and one mark for "Never".

Content and Face Validation

The four expert panels from medical and law backgrounds gave comments on the first version of the questionnaire. Few items were revised specifically on the wordings and terminologies used. The second version of the amended questionnaire was re-sent to the same expert panels for the final phase of content validation. Overall, the amended questionnaire was found to be clear, simple and understandable. For face validation, the pre-testing phase was conducted among ten staff from Universiti Sains Islam Malaysia (USIM) using the latest amended questionnaire. They gave good

feedback for the questionnaires and commented that items in the questionnaire were clear and easy to understand. Based on the comments and suggestions from content and face validation, no further changes were made.

Reliability (Internal consistency)

Internal consistency was evaluated using Kuder-Richardson Formula 20 (KR20) for knowledge because it was scored dichotomously while Cronbach's Alpha coefficient was used for attitude and practice. An acceptable KR20 or Cronbach's alpha coefficient was 0.7 or greater (Aron and Aron, 1999). Corrected items-total score correlation was carried out to examine the correlation of the item with the overall domain. A correlation value of less than 0.2 indicated that the corresponding item did not correlate with the overall scale and would be discarded (Huang, Huang and Thomas, 2006).

Construct Validation

In this phase, exploratory factor analysis (EFA) was conducted for all remaining items (Attitude:16 items; Practice:14 items). The results showed that Kaiser-Meyer-Olkin test (0.581) and Bartlett's test of sphericity (chi-square, df= 575.92, 136; p <0.001) for attitude met the criteria required for factor analysis. A five-factor solution was obtained with a total of 16 items from attitude domain, and the total variance explained by the four factors was 57.5%.

Whereas Kaiser-Meyer Olkin test (0.634) and Bartlett's test of sphericity (chi-square, df= 363.83, 91; p-value <0.001) showed that practice items met the criteria required for factor analysis too. A four-factor solution was obtained with a total of 10 items for the practice domain, and the total variance explained by the three factors was 53.0%.

Data analysis

Data entry and analysis were conducted using SPSS version 20.0 (IBM SPSS Statistics, 2012). Mean for continuous variables and standard deviations were calculated. In addition, the frequencies and percentages for categorical variables were also obtained.

3. Results

Respondent's background

The respondent's background is listed in Table 1. Majority of the respondents were women, received tertiary education, staying in the Klang Valley area. The mean (sd) age obtained was 27.8 (11.7). Half of them stayed in either terrace, cluster or townhouse.

Table 1: Respondent's background

Details	Frequency	Percentage
Gender		
Male	34	85.0
Female	6	15.0
Education		
Secondary school	4	10.0
University	36	90.0
Age mean (sd): 27.8 (11.7)		
Marital status		
Married	12	30.0
Single	28	70.0
Area		
Klang Valley	29	72.5
Others	11	27.5
Residency		
Detached house	10	25.0
Flat/apartment	5	12.5
Semi-detached house	4	10.0
Terrace/cluster/townhouse	21	52.5
Tested COVID-19		
Yes	2	5.0
No	38	95.0
Diagnosed with COVID-19		
Yes	0	0
No	40	100.0

Item difficulty

Based on the item analysis conducted on the knowledge domain, the difficulty indexes for knowledge items ranged from 0.87 to 0.95 while discrimination indexes ranged from 0.27-0.64 as mentioned in Table 2. The knowledge section was considered as having a less optimal level of difficulty. The optimal level of item difficulty should range between 0.67-0.79 (Taib and Yusoff, 2014; Dixon, 1994). The questions can be considered as too easy and probably because of the familiarity of the respondents on COVID-19. For the discrimination index, the value showed that the knowledge domain was able to discriminate performance of good and poor knowledge of the respondents.

Table 2: Difficulty and discrimination index

Item	Dif-i	Dis-i
K1a	0.93	0.27
K1b	0.83	0.36
K1c	0.93	0.27
K2a	0.88	0.36
K2b	0.85	0.36
K2c	0.85	0.36
K2d	0.93	0.36
K2e	0.78	0.64
K3a	0.95	0.27
K3b	0.95	0.27
K3c	0.93	0.45
K3d	0.95	0.27
K3e	0.93	0.36
K3f	0.95	0.27
K4a	0.88	0.55
K4b	0.90	0.45

Dif-I: Difficulty index; Dis-i: Discrimination index

Table 3: Reliability analysis index (knowledge)

Items in Attitude	Focus	Cronbach alpha	Characteristic of the item considered for removing	
			Corrected item-total correlation	Cronbach alpha of item deleted
K1a	Covid-19 transmission	0.93 (KR20)	0.951	-
K1b			0.505	
K1c			0.741	
K2a	Covid-19 symptoms		0.595	-
K2b			0.589	
K2c			0.589	
K2d			0.772	
K2e			0.451	
K3a	Prevention of community transmission		0.951	-
K3b			0.951	
K3c			0.666	
K3d	Hygiene protection (facemask, hand sanitizer and washing)		0.951	-
K3e			0.772	
K3f			0.951	
K4a	Laws and regulations of the Movement Control Order (MCO)		0.595	-
K4b			0.666	

Reliability (Internal consistency)

From Table 3, KR20 of value 0.931 was obtained for the knowledge domain. Tables 4 and 5 showed Cronbach's alpha coefficients value for attitude domain was 0.89 after items (A12) was dropped while 0.87 value was obtained for practice. The acceptable values of Cronbach's alpha, ranged from 0.70 to 0.95 (DeVellis, 2016). The knowledge and practice items had fairly good corrected item-total score correlation values which were between 0.40 to 0.85 and 0.40 to 0.75 respectively. For the attitude domain, the corrected item-total score correlation had a fairly good correlation ranging from 0.35 to 0.73 after A12 were dropped. The items with corrected item-total correlation lower than 0.30 are not acceptable (Cristobal, Flavián and Guinalíu, 2007).

Table 4: Reliability analysis index (attitude)

Items in Attitude	**Focus**	**Cronbach alpha**	**Characteristic of the item considered for removing**	
			Corrected item-total correlation	**Cronbach alpha of item deleted**
A1	Seeking information regarding MCO	0.88	0.715	-
A2			0.639	
A3	Obeying MCO		0.702	-
A4			0.736	
A5			0.716	
A6	Action taken when having symptoms		0.513	-
A7	(calling the hotline, seeking medical		0.522	
A8	attention, home quarantine)		0.399	
A9	Adherence to SOP		0.738	-
A10			0.672	-
A11			0.713	-
A12*			0.058*	0.89
A16			0.493	
A13	Prevention (Adherence to face mask,		0.240	-
A14	Hand washing/hand sanitizer/Social		0.454	
A15	distancing)		0.694	
A17			0.495	

*Removing item A12 from the Attitude domain, can considerably increase the reliability

Table 5: Reliability analysis index (practice)

Items in Attitude	Focus	Cronbach alpha	Characteristic of the item considered for removing	
			Corrected item-total correlation	Cronbach alpha of item deleted
P1 P2 P7 P8 P10	Prevention (Adherence to face mask, avoid crowd places, screening and seeking treatment)	0.87	0.780 0.627 0.498	-
P3 P4 P11	Hygiene (handwashing, use hand sanitizer, avoid touching face with dirty hands)		0.610 0.688 0.539	-
P5 P6 P9	My Sejahtera application and seeking info		0.539 0.530	-
P12 P13 P14	Laws and regulation on MCO (obey, warning those not obeying, educate relatives and close friends)		0.651 0.564 0.553	-

4. Discussion

This present study was intended to validate the psychometric properties of KAP towards measures for preventing the spread of COVID-19 in Malaysia. The selected scales in the KAP showed acceptable and satisfactory internal consistencies. Cronbach's alpha coefficients for knowledge, attitude and practice were 0.93, 0.89 and 0.87 respectively and therefore confirming the adequacy of the internal consistencies of these scales. Results of exploratory factor analysis showed that all the factors were clearly associated with the dimensions of attitude and practice.

5. Conclusion

After one item dropped from the attitude domain, the findings of this pilot study showed that the instrument was valid and reliable to be used in a further larger study. This pilot study demonstrated that the three scales of knowledge, attitude and practice in the questionnaire were reliable and valid to be used, although further analysis needs to be improved especially on the knowledge scale due to low level of difficulty.

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