ORIGINAL ARTICLE

EXPLORATORY FACTOR ANALYSIS OF KNOWLEDGE, ATTITUDE, PREVENTIVE PRACTICES AND HEALTH BELIEF TOWARDS HAND, FOOT, AND MOUTH DISEASE (HFMD) QUESTIONNAIRE FOR CARETAKERS

Yuzana Mohd Yusop[1*], Wan Nor Aliza Wan Abdul Rahman[1], Wan M. Asyraf Wan Afthanorhan[2], Nurul Asyikin Ahmad[1] and Harmy Mohamed Yusoff[1]

[1]*Faculty of Medicine, Universiti Sultan Zainal Abidin, Malaysia.*
[2]*Faculty of Business and Management, Universiti Sultan Zainal Abidin, Malaysia.*

***Corresponding author:Yuzana Mohd Yusop**
Email: yuzanayusop04@yahoo.com

ABSTRACT

The aim of this project is to develop and validate the Malay language version of the Hand, Foot, and Mouth Disease (HFMD) questionnaire for caretakers. A cross sectional study was conducted among 352 respondents. The self-administered questionnaire for HFMD contains four domains and a total of 30 items. The study included 75 kindergartens in Kuala Terengganu. Three government entities that operate kindergartens have offered a list of locations. Participants in this study were caretakers who were directly involved in the care of the children in the selected kindergartens. Several available methods were conducted for this study. The Cronbach Alpha method and Exploratory Factor Analysis were applied to determine the reliability and validities of the proposed constructs using pilot data. It was shown that the proposed constructs (varimax maximization) were reliable and valid for further investigation. Next, the new data was re-collected guided from pilot result suggestions to represent the field work. The field work data was then analyzed using Confirmatory Factor Analysis (CFA) to assess the performance of the measurement model. All constructs were fit and met the acceptable limits of model fitness, reliability, and validities. This HFMD tool underwent forward and reverse translation, content validation, and adaptation in the Malay language. The validity and reliability of this measure have been established for HFMD's satisfactory exploratory factor analysis and internal consistency in measuring Knowledge, Attitude, Preventive Practices, and Health Belief.

KEYWORDS: *Knowledge, Attitude, Preventive Practices, Health Belief, HFMD*

INTRODUCTION

Hand, Foot, and Mouth Disease (HFMD) is caused by enteroviruses such as polioviruses, coxsackieviruses, and echoviruses, among others [1]. Two of the most frequent viruses are Coxsackievirus A16 and Enterovirus 71 (EV71). In 1957, the first case of HFMD was discovered in New Zealand. This disease can be found all throughout the world, although it is more frequent in Southeast Asia [2]. During these outbreaks, most children with classic HFMD signs healed without ill effects. In many fatal cases, however, Enterovirus 71 (EV71) was discovered [3]. The symptoms of HFMD include fever, nausea, and a loss of appetite. One to two days later, painful ulcers emerge in the mouth. Some children's palms and soles are developing red areas that may develop into blisters. The knees, elbows, and buttocks of a child may develop this skin rash. This rash is not usually itchy. Due to a lack of appetite and severe mouth ulcers, children may refuse to drink, placing them at risk of dehydration. Infected children exhibit a variety of symptoms. Some children may simply have a skin rash or mouth ulcers, while others may have all the typical signs and symptoms. Some youngsters who are afflicted exhibit no symptoms at all. Children under the age of five accounted for 90% of HFMD cases. In Asia, HFMD is a major public health concern, with the potential to spread globally. In Malaysia, HFMD's prevalence, incidence, aetiology, and disease burden was virtually unknown before May 1997. The first recorded HFMD outbreak in Malaysia occurred in April 1997, initially in the state of Sarawak (Borneo Island, East Malaysia) and then spread to peninsular Malaysia by June [4]. The incidence of HFMD and its associated risk factors has been described by a few researchers. Furthermore, most trending studies, particularly in Malaysia, concentrated on possible causes of HFMD, climate related HFMD, and retrospective epidemiology inquests. Research on school environmental features and their association with HFMD is limited. However, information on HFMD Knowledge, Attitude, Health Belief, and Preventive Practices among kindergarten caretakers is lacking, and most current studies focused on mothers, both parents

and babysitter, underlining the need for more research to fill this knowledge gap. As a result, the goal of this study is to describe and determine the validity and reliability of measuring the Knowledge, Attitude, Preventive Practices, and Health Belief of HFMD among kindergarten caretakers. As a result, the findings of the study will aid in the development of a reliable evaluation instrument that focuses on areas where kindergarten caretakers can improve to avoid the spread of HFMD. Furthermore, because there is no thorough validated Knowledge, Attitude, Preventive Practices, and Health Belief questionnaire on HFMD yet, the information would be valuable for HFMD health education campaigns. As a result, the validity and reliability of the HFMD Knowledge, Attitude, Preventive Practices and Health Belief adopted and adapted have not been established.

METHODS

Research design

Hand, foot, and mouth disease 30 items questionnaire for kindergarten caretakers was validated (involving questionnaire development, questionnaire validation, assessment of validity and reliability) in this quantitative, cross-sectional study. This research was carried out in two phases. The duration of this study was about up to 1.5 years which includes development and validation phase including cumulative volume index, face validity index, exploratory factor analysis, confirmatory factor analysis known as CVI, FVI, EFA and CFA; 18 months (Sept 2019 – Feb 2021).

Participants and recruitment

Participants in this study were caretakers who were directly involved in the care of the children in the selected kindergartens. Kindergarten caretakers who met the study's inclusion and exclusion criteria were included in the study. In total, there were 75 kindergartens in Kuala Terengganu. The reference population for this study was caretakers of kindergartens in Kuala Terengganu. The source population was caretakers from all kindergartens in Kuala Terengganu who took part in the study. Most kindergartens have two or three rooms. A teacher and an assistant supervise (caretakers) each class of 15 to 25 students. Those who declined to participate in the study and those who were unavailable during the survey's administration were also excluded.

Study location

According to statistics from the Department of Education Terengganu, Jabatan Kemajuan Masyarakat Negeri Terengganu, and Jabatan PASTI Negeri Terengganu, Kuala Nerus has the most kindergartens compared to the other districts in Terengganu. As a result, Kuala Nerus was chosen as the site for the main investigation. However, for this validation study the research is being conducted in Kuala Terengganu District.

Ethical approval

This study was approved by the Jabatan Kemajuan Masyarakat Negeri Terengganu [JKMN.TRG.610/11 JLD 35], the Jabatan PASTI Negeri Terengganu [PASTI/N/07/11/(019)], and the Universiti Sultan Zainal Abidin (UniSZA) Human Research Ethics Committee (UHREC) [UniSZA.C/2/UHREC/628-2 JLD (13)]. Permission from the principals of the individual kindergartens was obtained before the study began. Informed consent was obtained from all subjects involved in the study.

Sample size calculation

The sample size for this study was determined based on the research objectives. The following is the calculation made for each research objective: - This study had been conducted in two phases:

Phase 1: For Confirmatory Factor Analysis (CFA), the required sample size is based on the calculation for objective one.

Research objective one

To validate the questionnaire on Preventive Practices of HFMD among caretakers of kindergartens in Kuala Terengganu. There was a total of 30 items in the questionnaire used in this study. The questionnaire consisted of nine items assessing Knowledge of HFMD constructs, four items assessing Attitude of HFMD constructs, eight items assessing Health Belief constructs and nine items assessing Preventive Practices of HFMD constructs. It is highly preferable and adequate if the study could obtain 3x30 = 90 random samples from its population [5]. Therefore, 99 samples were needed after adding 10% expected drop-out/missing data.

Phase 1: Confirmatory Factor Analysis (CFA), the required sample size is based on the calculation for objective two.

Research objective two

To confirm the proposed factor structure of the questionnaire on Preventive Practices of HFMD among caretakers of kindergartens in Kuala Terengganu. Meanwhile, it is highly preferable and adequate if the study could obtain 10 x 30 =300 random samples from its population. The sample size for research objective two was 330 samples, after adding 10% expected drop-out or missing data. So, the final estimated sample size calculated from objective 2 was chosen for questionnaire development and validation of about 330 samples. The researcher distributed 380 questionnaires to

make sure enough samples would be obtained for the purpose of the study.

Data collection procedure

All kindergartens in Kuala Terengganu were given the surveys (Phase 1 and Phase 2 separate samples for each phase). The research goal was indicated in the cover letter, and the caretakers were asked to participate voluntarily. The researcher visited the individual kindergartens after identifying the respondents (Jabatan Kemajuan Masyarakat Negeri Terengganu and Jabatan PASTI Negeri Terengganu provided a list). The researcher obtained permission from the headmaster or owner of the individual kindergartens to deliver the questionnaires to the participants. Exclusion criteria included those who were unwilling to participate in this study and who were absent during the conduct of the survey. The questionnaires were gathered on the same day by the researcher (during the field visit to the kindergarten base from the list of caretakers available at the premises). The responders' personal information was removed. The aforesaid procedures were used in the study to allow respondents to freely answer the questionnaire and guarantee that the replies supplied reflected their true feelings. As a result, response bias owing to time constraints and the researcher's presence would be minimized.

Questionnaire development process

Many studies have been undertaken about HFMD. Most research, however, has focused on mothers and caretakers' knowledge, attitudes, and practices. Yet, the purpose of the study is to assess the present level of Knowledge, Attitude, Health Belief, and HFMD Preventive Practices among kindergarten caretakers. Furthermore, to recognise and manage the HFMD epidemic as early as feasible, a thorough consideration of Knowledge, Attitude, Health Belief, and Preventive Practices among kindergarten caretakers is required. It is quite challenging to obtain a thorough questionnaire to evaluate the issue to meet the study's requirements. Due to the study's needs, these questionnaires were incorporated and adapted. The survey data allows the investigator to assess whether there are any correlations between the various variables represented in the questionnaire [6]. The questionnaire was revised from the previous research questionnaire as given in Table 1 to assess the Knowledge, Attitude, Health Belief, and Preventive Practices of kindergarten caretakers [7,8,9]. A few of the questions were also given in the table.

Table 1: The source of all the items and several questions from the items used for this study

Construct item	Questions
Knowledge (Othman et al.,2012)	Children between the ages of one and five are at risk for HFMD. The disease of HFMD is an infectious disease. HFMD can be fatal.
Attitude (Nasir et al.,2015	I'm terrified of HFMD. There is no need to seek therapy for HFMD right away because there is no cure. The most significant function in HFMD control is that of the preschool caretakers.
Health Belief (Qudsiah et al.,2017)	I believe that all HFMD patients will require hospitalisation. I am certain that the doctor will be able to treat HFMD. Handwashing with soap can help reduce HFMD infection.
Preventive Practices (Qudsiah et al., 2017)	After using the restroom, I shall thoroughly wash my hands. Every time I wash my hands, I scrub for at least 20 seconds. When I wash my hands, I always use soap.

The process of translation and adaptation of instrument

It was necessary to translate the questionnaire into Malay language (Bahasa Malaysia) for the majority of the populace to understand it. In the context of verbal or literal equivalency, the translation took the interpretation of the intangible comparable. The translation of the questionnaire took about a month.

The entire questionnaire was translated, including the question items, response options, and instructions to the respondents. The consent form and the participant information sheet were also translated. During the translation process, the original meaning of the questions was preserved.

Table 2: Questionnaire item category

Category	Total items	Scoring description
Part A: Demographic information	**7**	
Part B: Knowledge	**9**	5-point Likert Scale (1 = Strongly disagree, 5 = Strongly agree)
Part C: Attitude	**4**	5-point Likert Scale (1 = Strongly disagree, 5 = Strongly agree)
Part D: Health Belief	**8**	5-point Likert Scale (1 = Strongly disagree, 5 = Strongly agree)
Part E: Preventive Practices	**9**	5-point Likert Scale (5 = Always, 1 = Never
Total	**37**	

Expert panel

The goal in this step is to identify and resolve the inadequate expressions or concepts of the translation, as well as any discrepancies between the forward translation and the existing or comparable previous versions of the questions. The expert panel may question some words or expressions and suggest alternatives. A group of experts consisting of Family Medicine Specialist and Pediatric contribute their expertise. Only a few minor corrections mainly pertaining to the structure of the questions.

Forward and backward translation

The study's questionnaire was translated into Malay to make it understandable and acceptable to most of the community. The conceptual equivalent of questions was examined in the translation. The questionnaire's uniqueness is difficult to retain. However, during the translation and cultural reinterpretation process, special attention was paid to preserving the questionnaire's purpose, clarity, and coherence. An English teacher completed the translation of the questionnaire. The questionnaire was then circulated to the expert panel. The instrument was then translated back to English using the same method as an independent translator whose first tongue is English and who is unfamiliar with the questionnaire. According to their comments, the questionnaire was easy to interpret.

Pilot study analysis pertaining to this study

The purpose of this study is to conduct an evaluation of the questionnaire's reliability and validity. Aside from that, the study was able to detect any impediments or limits, as well as the respondents' understanding of the questionnaire. It also serves to track how long it takes to complete the questionnaire. The questionnaire items included in the study instrument constructions were designed to minimise any confusion and to detect the items' flaws [10]. This study is also advised for large-scale research to improve the internal validity of the research tools [11,12]. This validation study feedback can be utilised to create a research instrument that will allow the items to measure the created structures. A pilot study is conducted to determine the suitability or rationale of the study to be conducted [13]. The pilot study is an essential component of any excellent research tool [14]. Furthermore, pilot studies allow researchers to get feedback from the group being evaluated and make improvements to the instruments utilized [10].

The Exploratory Factor Analysis (EFA) technique

Knowledge

Nine items of Knowledge construct were subjected to the extraction method of principal component with varimax (variation maximization). For Bartlett's Test of sphericity was significant (P-value < 0.05). Moreover, measurement of sampling adequacy by Kaiser-Meyer-Olkin (KMO) was excellent as it exceeded the required value of 0.6 [11,15,16,17]. The interpretation on both findings (significant Bartlett's Test and KMO was greater than value> 0.6) demonstrate that the data is satisfactory to proceed further with the data reduction in EFA [11,15,16,17,18]. The computed Eigenvalue greater than 1.0, and there is one component or dimension that emerged from the EFA procedure. The eigenvalue was 0.944. The total variance explained to measure this construct was 67.22%, which is more than the 60% minimum requirement [11,15,16,17]. Thus, it was acceptable for further process. Finally, Cronbach's alpha value is used to determine internal consistency or internal reliability. The internal consistency demonstrates how strong the respective items are in calculating the construct. The value of Cronbach's alpha should be greater than 0.7 for the items to achieve internal consistency [11]. By measuring internal consistency or reliability, Cronbach's alpha values for the component were rated as 0.78.

Attitude

Four items were included in the questionnaire for this construct. The mean score for each item ranged between 1.80 to 4.26, whereas the standard

deviation score ranged from 0.74 to 1.50. On these four items measuring Attitude construct, the construct of Attitude was subjected to the extraction method of the main component with varimax (variation maximization) rotation. The Bartlett's Test of Sphericity was significant (P-value < 0.05). Moreover, measurement of sampling adequacy by Kaiser-Meyer-Olkin (KMO) was excellent as it exceeded the required value of 0.6 [11,15,16,17]. Both findings of Significant Bartlett's Test, and KMO greater than value> 0.6, demonstrate that the data is satisfactory to proceed further with the data reduction in EFA [11,15,16,17,18]. The eigenvalue value was 1.179. The total variance explained to measure this construct was 63.29%, which is more than the 60% minimum requirement [11,15,16,17,18].

Thus, it was acceptable for further process. The dimensions emerged from the EFA procedure and their respective items. There are no items deleted as the factor loading for every item is greater than 0.6 [11,15,18]. Finally, Cronbach's alpha value is used to determine internal consistency. The value of Cronbach's alpha should be greater than 0.7 for the items to achieve internal consistency [11]. By measuring internal consistency or reliability, Cronbach's alpha values for the component was rated as 0.76.

Health Belief

The mean score for eight items Health Belief ranged from 1.96 to 4.56 for each item, while the standard deviation score ranged from 0.65 to 1.39. Eight items of Health Belief construct were subjected to the extraction method of the principal component with varimax (variation maximization) rotation. The Bartlett's Sphericity test (P-value < 0.05) was significant. Also, measurement of sampling adequacy by Kaiser- Meyer-Olkin's (KMO) was excellent, as it exceeded the required value of 0.6 [11,15,16,17]. The interpretation on both results (Significant Bartlett 's Test, and KMO value greater than > 0.6) demonstrate that the data is satisfactory to proceed further with the data reduction process in EFA [11,15,16,17,18]. The computed Eigenvalue greater than 1.0, and there is one component or dimension that emerged from the EFA procedure. The eigenvalue was 1.324. The total variance explained for assessing this construct was 65.57%, which is more than the 60% minimum requirement [11,15,16,17,18]. Thus, it was acceptable to further the process. There are no items deleted for Health Belief as the factor loading for every item is greater than 0.6 [11,18]. Therefore, every item is suitable for assessing this latent construct. Finally, by measuring internal consistency or reliability, Cronbach's alpha values for the component was rated as 0.79.

Preventive Practices

Nine items were included in the questionnaire for this construct. The mean score ranges from 3.93 to 4.50, with a standard deviation ranging from 0.69 to 0.96. The construct of Preventive Practices was subjected to the component extraction method with varimax rotation (variation maximization). The Bartlett Sphericity test (P-Value < 0.05) was significant. More importantly, measurement of sampling adequacy by Kaiser - Meyer-Olkin's (KMO) was excellent as it exceeds its required 0.6 value [11,15,16,17]. The interpretation on both findings (significant Bartlett 's test, and KMO value greater than > 0.6) demonstrate that the data is satisfactory to proceed further with the EFA reduction procedure [11,15,16,17,18]. The data are appropriate for further processing of the data reduction process. The computed Eigenvalue greater than 1.0, and there is one dimension or component emerged from the EFA procedure. The eigenvalue was 5.459. The total variance explained to measure this construct was 65.57%, which is more than the 60% minimum requirement Thus, it was acceptable for further process. There are no items deleted as the factor loading for every item (dimension emerged from the EFA procedure) is greater than 0.6 Therefore, every item is suitable for assessing this latent construct. After all, Cronbach's alpha value was used to determine internal consistency to demonstrate how strong the respective items in calculating the construct. The value of Cronbach's alpha should be greater than 0.7 for the items to achieve internal consistency. By evaluating internal consistency or reliability, Cronbach's alpha values for the component were rated as 0.91. after the EFA procedure.

Field work analysis

For the data analysis in this study, IBM-SPSS-AMOS (Statistical Package for Social Science Analysis of Moments Structures) version 23.0 was utilised. The measurement model and the structural model comprised the Structured Equation Model (SEM). Prior to analysing the SEM, a modification test was run to ensure that the test indicator accurately represented the measured construct. The benefit of utilising SEM is that it identifies the variant error in each examined variable. The SEM analysis offers a high level of instrument reliability [19]. Exploratory Factor Analysis (EFA)and Confirmatory Factor Analysis (CFA) are two necessary analyses that must be completed before the SEM analysis can be performed.

RESULT

Respondent profile

A total of 352 samples were collected from kindergarten caretakers in Kuala Terengganu for this study. All the respondents (100%) were female. Meanwhile, the majority of 194 respondents (55.0%) were aged 21 to 40. Most of the people who responded were married. In terms of education, 188 of the survey's 53.5% had completed their secondary school exams. Many caretakers had been in this field for a while, with 182 (51.6%) having worked for more than ten years. According to the number of students in each class, 260 (74.0%) of the caretakers were responsible for 21 to 25 students.

Confirmatory Factor Analysis (CFA) technique

Reliability and validity analyses

To test the internal consistency of each construct of the questionnaire, a reliability test was performed.

Based on the results from CFA, the researcher needs to look for the fitness indexes of the measurement model, factor loading for each item and the correlation among the constructs. The fitness indexes portray the construct validity, whereas the factor loading implies the significance of the respective item in the measurement of its constructs. Construct validity assessment is based on fitness indexes, for this new measurement tool for HFMD. Through our findings, Cronbach's alpha values varied from 0.64 to 0.71 for all scales i.e., 0.64 for Knowledge, 0.67 for Attitude, 0.71 for Health Belief and 0.67 for Preventive Practices, indicating acceptable reliability for all scales utilized (Table 3). Findings in this study confirm the satisfactory psychometric characteristics of researcher modified instruments, as well as their reliability or suitability for application in each situation. The results demonstrate that fitness indices met the expert's suggested level of construct validity [11,12]. Therefore, the measurement model has fulfilled the requirement of construct validity. Once all the requirements in the CFA have been met, researchers can continue to carry out the SEM procedure to answer the hypothesis of the study. The study then needs to calculate the AVE value for each construct to evaluate its convergent validity. The study also needs to calculate CR for each construct to evaluate the item 's reliability in assessing a respective construct. The AVE's minimum threshold value is 0.5, whereas the CR's minimum threshold value is 0.6. Table 3 presents results for AVE and CR. In Table 3, the study found that all AVE and CR values exceeded their respective threshold values of 0.5 and 0.6, respectively [11,21]. Therefore, the result indicates that convergent validity and composite reliability has been achieved for this latent construct.

***Analysis of validation factors for all* measurement models (Pooled CFA)**

As previously stated, the research needs to determine the discriminant validity among all the model constructs. The Pooled CFA analysis aims to assess the value of the correlation between the constructs used to meet discriminant validity. The expert states that if the value between correlations exceeds 0.85, there exists a redundancy between the constructs [21]. Figure 1 shows all the first level constructs by taking the mean score for each dimension. Double-headed arrow indicates a discriminant validity construct between constructs

The Pooled CFA, where the value of a single-headed arrow indicates the value of the weighting factor for each item and the value of the double-headed arrow indicates the value of the correlation between the constructs. While Figure 2 shows the analysis for Pooled CFA. Once all the CFA output has been achieved, the research needs to be validated again for validity and reliability. Based on the results from CFA, the researcher needs to look for the fitness indexes of the measurement model, factor loading for each item and the correlation among the constructs. The fitness indexes portray the construct validity, whereas the factor loading implies the significance of the respective item in the measurement of its constructs. Therefore, the measurement model has fulfilled the requirement of construct validity. Once all the requirements in the CFA have been met, researchers can continue to carry out the SEM procedure of the study. The discriminant validity is essential to confirm that no strong relationship exists between all constructs to avoid multicollinearity problems [17,21,22]. The results of fitness indexes demonstrate that fitness indices met the expert's suggested level of construct validity. The diagonal values in bold are the respective constructs ' square root of the AVE while other values are the correlations between the respective pair of constructs. The discriminant validity met the requirement if all values of the AVE (diagonal) are higher than any other values in its row and column [17,21,22]. The tabulated values are presented in Table 4 to fulfill the discriminant validity threshold. Hence, the study found that the model achieves the discriminant validity for all constructs in each situation.

Table 3: Factor loading value, CR and AVE each construct for convergent validity test

Constructs	Items	Factor lording	CR (> 0.6)	AVE (> 0.50
Knowledge	K1	0.77	0.941	0.640
	K2	0.71		
	K3	0.92		
	K4	0.79		
	K5	0.84		
	K6	0.86		
	K7	0.81		
	K8	0.75		
	K9	0.73		
Attitude	A1	0.76	0.890	0.670
	A2	0.86		
	A3	0.84.		
	A4	0.81		
Health	HB1	0.78	0.952	0.712
	HB2	0.96		
	HB3	0.77		
	HB4	0.81		
	HB5	0.73		
	HB6	0.86		
	HB7	0.84		
	HB8	0.92		
Preventive Practices	PP1	0.79	0.946	0.660
	PP2	0.77		
	PP3	0.81		
	PP4	0.73		
	PP	0.86		
	PP6	0.84		
	PP7	0.77		
	PP	0.96		
	PP9	0.76		

The skewness value within the range of -1.0 and 1.0 means that the distribution does not depart from normal [15,22]. It shows that data distribution meets all the normal distribution requirements for the use of parametric statistical analysis. After completion of the CFA, the validity, reliability, and normality distribution requirement are achieved for the Knowledge, Attitude, Preventive Practices and Health Belief towards HFMD questionnaire.

Table 4: Summary of the discrimination validity index for all constructs

Constructs	Knowledge	Attitude	Health Belief	Preventive Practices
Knowledge	0.800			
Attitude	0.190	0.818		
Health Belief	0.140	0.160	0.844	
Preventive Practices	0.210	0.160	0.360	0.812

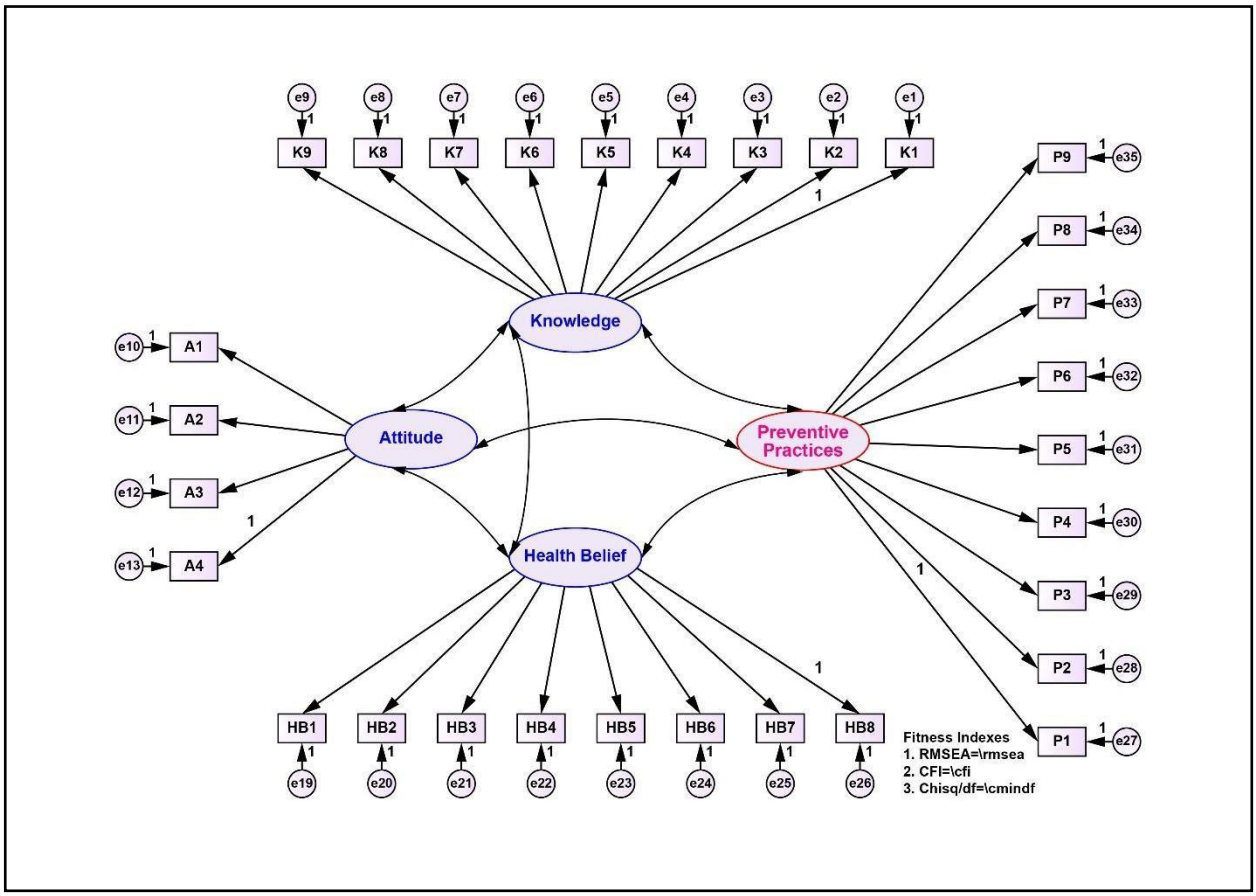

Figure 1: Pooled confirmatory factor analysis (CFA)

DISCUSSION

The Malay version of the Knowledge, Attitude, Preventive Practices, and Health Belief about HFMD questionnaire was validated and found to be reliable in this study. The primary purpose of the present study was to examine the factor structure of revised Knowledge, Attitude, Preventive Practices & Health Belief towards HFMD questionnaire with a sample of caretakers in Kuala Terengganu district. Researchers adapted and translated the Malay version of the combined questionnaire for kindergarten caretakers' Knowledge, Attitude, Health Belief, and Preventive Practices [7,8,9]. Several research were undertaken when the HFMD outbreak broke out a few years back in Malaysia. However, it focuses on parental [9,23], and caretaker or teacher [23,24], visitors [7], as well as risk factors [25], climate [26], and epidemiological reviews [27,28,29]. Even though they focused their research on knowledge, attitude, and preventive actions, they used a variety of measurement tools. But the aim of the current study was to use revised analytic procedures and to examine the factor structure of the Knowledge, Attitude & Preventive Practices with enhanced element of Health Belief towards HFMD. Besides this scale could be established for other communicable disease too. The result of EFA for this study revealed that all latent constructs in the model are measured used several dimensions or components, and each component contains certain items which indicate the involvement of all constructs. In the current study, the findings show that the result meets all the required criteria, validity (Bartlett's test is significant, KMO > 0.6, Total variance explained > 60% and factor loading > 0.6) and reliability value > 0.70. No questionnaire items were deleted. The reliability of items in all components of the respective construct, Cronbach's alpha, is above 0.7 thresholds [30]. Thus, a considerable measure of reliability is demonstrated. The results have shown that the questions were valid. The extent to which constructs have been free of random errors [32]. Cronbach's alpha's cut - off value is 0.60 is acceptable, while a value of 0.80 is deemed excellent [31]. Cronbach's alpha is the most prefer method to measure among the common coefficient methods of evaluating internal consistency within the items. The constructions were devoid of random errors to a certain extent [32]. Cronbach's alpha's cut-off value is 0.60 [31], whereas a value of 0.80 is considered outstanding. Among the common

coefficient techniques of analysing internal consistency inside the items, Cronbach's alpha is the most preferred method of measurement. The CFA approach recognises the relationship between both the observed variables and the underlying constructs with free inter-correlation factor [33,35]. The confirmatory measurement model was used in this study to measure unidimensionality, construct validity, convergent validity, and discriminant validity. The measurement model was conducted on independent and dependent variables [34]. The importance of assessing how well-observed variables relate to a set of latent constructs [35]. The fitness index of measurement models defines how strong the item is when assessing the latent constructs [32]. Indeed, the CFA analysis findings showed that all constructs meet predefined requirements, namely factor loading value greater than 0.6, validity value (AVE greater than 0.5), reliability value (CR greater than 0.6) and fitness index value (RMSEA < 0.08, CFI > 0.90 and Chisq / df < 5.0). There are no questionnaire items deleted during CFA. Moreover, CFA pooled analysis achieved the validity of all constructs in the study model. Effectively all three types of validity met the requirement in this study. Hence, the questionnaire is reliable and valid.

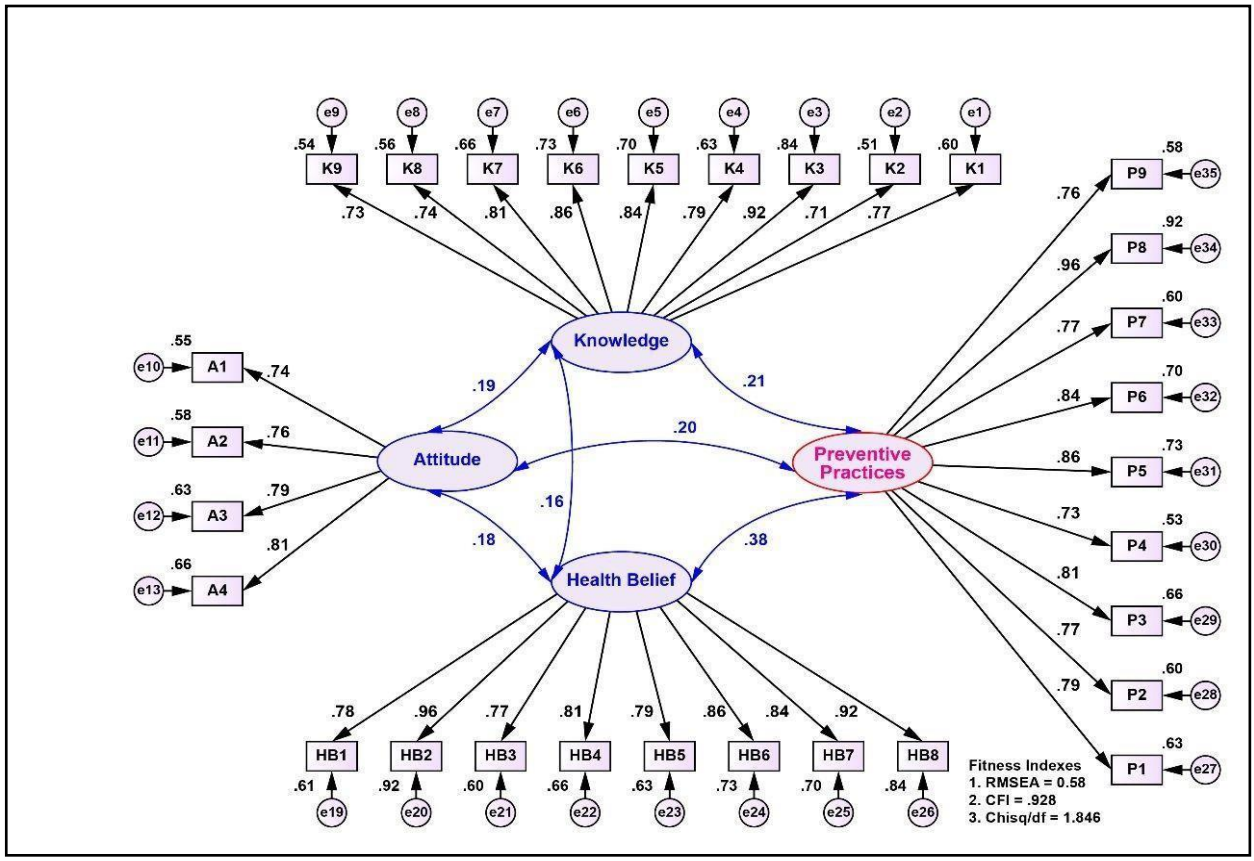

Figure 2: Analysis of pooled confirmatory factor analysis (CFA)

CONCLUSIONS

In the Malay language, this HFMD tool underwent forward and reverse translation, content validation, and adaption. This measure was proven to be valid and reliable for HFMD's satisfactory exploratory factor analysis and internal consistency in assessing Knowledge, Attitude, Health Belief, and Preventive Practices. With several Malay language speakers, researchers developed a scale that maybe used in Malay-speaking territories, with some modifications to suit their society, to assess Knowledge, Attitude, Health Belief, and Preventive Practices in their state, which has been found to reduce the spread of HFMD.

REFERENCES

1. Hand, Foot, and Mouth Disease [Internet] Western Pacific Region: World Health Organization (WHO); [Cited 2021 Dis 20]. Available from: http:// www. Wpro. who .int /

westernpacific/emergencies/surveilaance/archives/hand foot and mouth diseases

2. Koh WM, Bogich T, Siegel, K, and others. The epidemiology of hand, foot, and mouth disease in Asia: A systematic review and analysis. The Pediatric infectiousdisease journal. 2016 Oct; 35(10): 285-300.

3. Zhu FC, Liang ZL, Meng FY, and others. Retrospective study of the incidence of HFMD and sero epidemiology of antibodies against EV71 and CoxA16 in prenatal women and theirinfants. PloS one. 2012 May; 7(5): 1-6.

4. Chua, K. B., Kasri, A. R. Hand foot and mouth disease due to enterovirus 71 in Malaysia. Virologica Sinica. 2011 Augt; 26(4): 221-228.

5. Kline, RB. Principles and practice of structural equation modeling, 3rd ed. New York (NY): Guilford Press; 2010.

6. Bryman A, Cramer D. Quantitative data analysis for social scientists. Alternative Health Practitioner. 1994 July; 3(2):146-146.

7. Othman N, Wi W, Che Lamin R, and others. Knowledge, attitude and practices regarding Hand, Foot, and Mouth Disease of visitors in Hospital Tengku Ampuan Afzan, Pahang. Conference proceedings; 2012 July; Kuantan.

8. Nasir B, Fuad M, Abdelqader M, and others. Knowledge, attitude and practice of dengue fever and health education programme among students of Alam Shah science school, Cheras, Malaysia. Malaysian Journal of Public Health Medicine. 2015 September; 15(2): 69-74.

9. Qudsiah S, Salmiah MS, Nor Afiah M Z. Predictors of preventive practices towards HFMD among mothersof preschool children in Klang District. Malaysian Journal of Medicine and Health Science. 2017 Oct; 13(3): 21-32.

10. Creswell, J. W. Research design: Qualitative, quantitative, and mixed methods approach 4th ed. California: Sage Publications,Inc.; 2014.

11. Awang, Z. Research methodology and data analysis. Shah Alam: Penerbit Universiti Teknologi MARA Press; 2012.

12. Idris N. Penyelidikan dalam pendidikan edisi 2. Shah Alam: McGraw-Hill Education (Malaysia) Sdn. Bhd.; 2013.

13. Chua YP. Kaedah dan statistik penyelidikan: Kaedah penyelidikan edisi 3. Shah Alam: McGraw-Hill Education (Malaysia) Sdn. Bhd.; 2014.

14. Corner EJ, Wood H, Englebretsen C, and others. The Chelsea critical care physical assessment tool

15. (CPAx): validation of an innovative new tool to measure physical morbidity in the general adult critical care population; an observational proof-of-concept pilot study. Physiotherapy. 2013 Mar; 99(1): 33-41.

16. Chik Z, Abdullah AH. Developing and validating instruments for measurement of motivation, learning styles, and learning disciplines for academic achievement. International Journal of Academic Research in Business and Social Sciences. 2018 Apr; 8(4): 594–605.

17. Noor NM, Aziz AA, Mostafa MR, and others. Validation of the Malay version of the inventory of functional status after childbirth questionnaire. Biomed Res Int. 2015; 2015:972728. 2015 Jan [cited 2022 May 5]. Available from: https://www.ncbi.nim.nih.gov/pmc/articles/PMC4312566/.

18. Hoque ASM, Awang Z, Jusoff K, and others. Social business efficiency: Instrument development and validation procedure using Structural Equation Modelling. International Business Management. 2017 Jan; 11(1): 222-231.

19. Yahaya T, Idris K, Suandi T, and others. Adapting instruments and modifying statements: The confirmation method for the inventory and model for information sharing behavior using social media. Management Science Letter. 2018 Apr; 8(5): 271-282.

20. Schumucker RE, Lomax RA. Beginner's guide to structural equation modeling 2nd ed. New Jersey: Lawrence ErlbaumAssociates Publishers; 2004.

21. Awang, Z. A handbook on SEM for academicians and practitioners: The step-by-step practical guides for the beginners. Kajang: MPWS Rich Resources; 2014.

22. Awang, Z. SEM Made Simple. Bangi: MPWS Publication Sdn Bhd.; 2015.

23. Kashif M, Samsi SZM, Awang Z, and others. EXQ: measurement of healthcare experience quality in Malaysian settings: A contextualize perspective. International Journal of Pharmaceutical and Healthcare Marketing.2016 Feb; 10(1): 27-47.

24. Mansor NH, Ahmad, A. Knowledge and prevention practices of Hand, Foot and Mouth Disease among parentsand caregivers in Bandar Puncak Alam, Selangor, Malaysia. Malaysian Journal of Public Health Medicine. 2021 Apr; 21(1): 29-36.

25. Siti Aida S, Haliza AR. Knowledge, attitude and practice towards Hand, Foot and Mouth Disease among nursery governesses in Klang Valley, Selangor. Malaysia Medical Health Science. 2019 Feb; 15(4): 40- 47.

26. Wan Mohamad WMZ, Ismail NA, Mohd Fuzi NMH. Risk Factors of Hand, Foot, and Mouth Disease outbreak cases among children under five years old in northeastern state of Malaysia. Malaysian Journal of Public Health Medicine. 2021 May; 21(2): 315-320.

27. Wahid NA, Jamaludin S, Abd Rahman H, and others. Effect of climate factors on the incidence of Hand, Foot, and Mouth Disease in Malaysia: A generalized additive mixed model. Infectious Disease Modelling. 2021 Augt; 6: 997-1008.

28. Hou ALU, Hanisab H., Roslan Z, and others. Review on epidemiology and clinical characteristics of Hand, Foot, and Mouth Disease in Sarawak. Sarawak Journal of Pharmacy. 2017; 1: 102-11.

29. Fong SY, Mori D, Rundi C, and others. A five-year retrospective study on the epidemiology of Hand, Foot and Mouth Disease in Sabah, Malaysia. Scientific reports. 2021 Sept; 11(1): 1-11.

30. Lee MHP, Chong YM, Tay CG, and others. Detection of enteroviruses during 2018 Hand, Foot, and Mouth Disease outbreak in Malaysia. Tropical Biomedicine. 2021 Mar; 38(1): 150-153.

31. Hair JF, Black WC, Babin BJ, and others Anderson. Multivariate data analysis 6th ed. New Jersey: Prentice Hall; 2006.

32. Hair JF, Anderson RE, Tatham RL, and others. Multivariate data analysis 5th ed. New Jersey: Prentice- Hall, 1998.

33. Choi, S. Exploring intention to adopt mobile tv service in the United States: Toward a new model with cognitive-based and emotional-based constructs. PhD Thesis. Columbia, South Carolina: University of South Carolina; 2010. 142.

34. Anderson JC, Gerbing DW. Structural equation modelling in practice: A review and recommended two step approach. Psychological Bulletin. 1998; 103(3): 411-423.

35. Wong, A. The Management of Customer Relationships in The Retail Industry. PhD Thesis. Melbourne: Monash University; 2002. 396.

36. Choi, K. Latent variable modelling in the hierarchical modeling framework in longitudinal studies: A fully Bayesian approach. Asia Pacific Education Review. 2001 July; 2: 44-45.