Original Research

DEVELOPMENT AND CONSTRUCT VALIDATION OF QUESTIONNAIRE ASSESSING THE ADULT IMMUNISATION PERCEPTIONS AMONG MALAYSIAN POPULATION

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ABSTRACT

Introduction: Immunisations are one of the most effective public health interventions, reducing or eliminating the burden of many infectious diseases. This study aims to establish the construct validity of a newly developed adult immunisation perceptions questionnaire among Malaysians. **Methods**: The Adult Immunisation Perceptions-Questionnaire (AIP-Q) was created following literature reviews on The Health Belief Model. Primarily, 64 questions were pooled, followed by face validity by experts, pre-tested via 20 healthcare personnel and later translate into the Malay language. A total of 305 respondents were selected for the construct validation process. Varimax rotation method used in the analysis for exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) done using AMOS software. **Results:** Ten constructs were produced as predicted in EFA: health believes, experience, knowledge, attitude, perceived severity, perceived susceptibility, perceived benefits, perceived barriers, and 2 cues for action. Thirteen items with low factor loading and unrelated to the recovered domains were removed from being included in CFA. In path analysis, the scale fitted $\chi 2/df=1.943$ (n=305) $=p<0.001$, CFI=0.908, IFI=0.909, TLI=0.901 and RMSEA=0.056. Strong factor loading was found across the final items, ranged from 0.53 to 0.94 with a good reliability test (Cronbach Alpha, AVE and CR values) for all constructs. **Conclusion:** The final AIP-Q consists of 10 domains with 45 items that give a promising psychometric property. This questionnaire can measure the perceptions of adult immunisation among the Malaysian population and can be utilized for the nationwide study.

Keywords: Adult immunisation perception questionnaire, factor analysis, construct validation

INTRODUCTION

Immunisations are one of the greatest public health achievements of the twentieth century (Alexa et al.,2016). Adult immunisation is not commonly practiced in most countries as well as in Malaysia. Even though there are significant morbidity and mortality due to Vaccine-Preventable Diseases (VPD) within this age group, the awareness of the benefits of immunisation for adults is still lacking (Malaysia Adult Immunisation Guideline, 2014). Hence, less attention has been given to adult immunisation, even in developed countries with strong public health infrastructures (Levine et al.,2011).

Data from the Ministry of Health Malaysia, 2011 showed that VPD are still commonly encountered in Malaysia, as the incidence rates for measles, hepatitis B and pertussis were 5.42, 4.32, 0.86 per 100,000 populations respectively (Malaysia Adult Immunisation Guideline, 2014). Whereas in Singapore, the proportion of influenza-associated deaths was 11.3 times higher in persons aged 65 years and above (Singapore Report, 2014). Meanwhile, in the United States, the VPD caused death in approximately 50,000 adults every year: 36,000 from influenza, over 6,000 from invasive pneumococcal disease and 5,000 from hepatitis B (US Report, 2009). However, fewer than 500 children die from VPD in the United States each year.

Various factors have been recognized to influence the perception towards adult immunisation and vaccine preference comprising socio-demographic, socio-economic, health-related factors, social impacts, disease/vaccine-related factors, common attitudes towards health and vaccines, custom, awareness and knowledge, real-world barriers and promoters, and humanity (Wheelock et al.,2013). Although strategies have been identified and few programmes have been initiated to encounter the low vaccine coverage in adults (Poland et al.,2010), little progress has been achieved.

This study aims to determine its reliability and validity based on structural equation modeling (SEM) within a CFA which provide reliable instrument and valid measurement for components of health belief. In addition this questionnaire should provide a useful tool to measure the perceptions of adult immunisation among Malaysian population with age group 18 and above.

METHODS

Respondents

This is a cross-sectional study, recruiting 305 respondents aged ≥18 years in April 2018. The study involved two health clinics in Gombak District, Selangor among people who are attending the health clinics regardless of patient or caregiver. All the respondents who fulfilled the criteria of (1) age 18 years and above (2) understand English or Malay language, and (3) willing to participate in the survey, were invited to participate in this study. The researcher cross-checks the answer thoroughly, ensuring no missing responses of the items and respondents allowed to verify the difficult or confusing questions. The respondents were told if they felt that they did not have enough information or knowledge about any of the items to select the best answer closest to their perception. This is an important element of the instructions so that the respondents would feel comfortable about answering the questions.

Instruments

The initial 64 items of the Adult Immunisation Perception Scale (AIPS) were generated to fill the gap in perception and its associated factors about adult immunisation among Malaysians. The Health Belief Model was used in developing items in the questionnaire where it includes the health belief model domains: susceptibility, severity, barriers, benefits, and cues to action as well as its associated factors including health belief, past medical experience, knowledge, and attitude towards adult immunisations. There are 4 steps to generate the items which are: (1) identify appropriate constructs, (2) form item pool, (3) define a format for measurement, and (4) all item pool should be revised by experts, and later pre-tested. (De Vellis, 2003) Description for each step is summarized as follow:

1) Identifying Appropriate Constructs

The questions were generated after wide exploration from quantitative and qualitative literature on knowledge, attitude, and perception about adult immunisations. Several instruments for measuring knowledge, attitude and perception regarding immunizations have been developed in various countries

at different times [Rashwan et al.,2011; Antoinette et al.,2012; Halperin et al.,2015; Donadiki et al.,2014 & Halperin et al.,2015]. The framework was based on Health Belief Model and any questionnaire related to perceptions with or without The Health Belief Model were used. Development of instrument items to measure the constructs in this study is based on the Lazarsfeld Scheme which involves four stages namely imaginary concept, specification concept, index selection and index construction.

2) Generating Item Pool

Originally, the item pool consisted of 64 items, in which five items to measure health belief, six items to measure past experience, 15 items measuring knowledge, six items measuring attitude and 32 items to measure perception which include four items to measure susceptibility, six items to measure severity, four items measuring benefits, four items measuring barriers, 11 items measuring cues for action.

3) Define Format for Measurement

Items were scored on a tenth-point agreement level; using Likert scale; 1 = Strongly Disagree to 10 = Strongly Agree. According to Zainudin et al.,2015, to determine how much agree or disagree of the respondent towards particular questions, the long scale such as 10 points is way better than the short scale. The respondents have also been told to choose the best answer closest to their perception about the topic even though they do not have enough knowledge or information about it. This instruction was important to make the respondents feel comfortable while answering the questions.

4) Experts review

Three experts were chosen among Public Health Consultant from Ministry of Health Malaysia and local universities to review the scale and content validity. According to Rosnah et al.,2013, the experts are better from healthcare professionals since they have enough information and updated with the objective and conceptual basis measure. They were evaluating the clarity of the items, decide whether they are relevant to the domain, and justify whether the items should remain in the pool or not.

The assessment of the questionnaire was continued pretested by selected 20 healthcare workers at a health clinic. They were asked to constructively comment on each item by evaluating its objective, suggest items for deletion, alteration, or recommend new items. All their perceptive thinking and probing results were recorded. Finally, the item pool was translated from English to Malay using the simplified back-translation method (Brislin, 1976).

Analysis of Data

The EFA used to assess items for its psychometrically, replicating Naing's suggestion (Naing, 2010). The EFA was commenced using principal component analysis (PCA) and promax rotation with eigenvalues more than 1; factor loading <0.40 was removed. It was then followed by an examination of rating scale quality and later by CFA. Analysis was performed using IBM SPSS Statistics version 22.

The value of the score scale groups was observed to create; (i) the group regularities exhibited a steady distribution (i.e., uniform, normal, bimodal, or slightly skewed), (ii) at least ≥10 responses per group item, (iii) the adjacent threshold distance between 1.4 and 5.0 logits, (iv) the regular measures increased monotonically through the score scale, (v) a different probability curve graph in each response group, and (vi) the outfit was <2 to measure the suitability of the ten-point Likert scale response group. The analysis replicated Rasch model analysis using Winstep (Bond & Fox, 2015).

Maximum likelihood estimate used in assessing model fitness to the covariance matrix of the CONFIRM data set, namely comparative fit index (CFI) > 0.9, goodness of fit index (GFI)> 0.9, normed fit index (NFI)> 0.9, root mean square error of approximation (RMSEA) range 0.05 to 0.1, and chi-square difference (chisq/df) <5.0 (Zainudin, 2012). The items that persistently stable after EFA and CFA analysis were reserved (Hair et al.,2010).

RESULTS

Respondents

Total of 305 respondents involved in validity and reliability study. Since this study was conducted using one-to-one interview, the response rate was 100%. Respondents age was between 18 to 71 years old, with mean (±s.d.) of 30.67 (±10.73) years. Female respondents were 190 (62.3%) compared to 115 (37.7%) males. The majority of the respondents were Malay, 257 (87.0%). In terms of work, 186 (61.1%) of them were working while 109(35.7 %) were unemployed and the rest were retired. 248 (81.3%) stayed in city area (Table 1).

Table 1: Details of socio-demographic characteristics of respondent participated in the validation study of Adult Immunisation Perception-Questionnaires (AIP-Q)

CHARACTERISTICS		FREQUENCY (n)	PERCENTAGE (%)
AGE (YEARS)	Mean (±SD): 30.67 (±10.73)		
GENDER			
	Male	115	37.7
	Female	190	62.3
RACE			
	Malay	257	84.3
	Chinese	26	8.5
	Indian	17	5.6
	Bumiputera Sarawak	1	0.3
	Bumiputera Sabah	4	1.3
MARITAL STATUS			
	Single	118	38.7
	Married	186	61.0
	Divorced	1	0.3
EDUCATION LEVEL			
	Illiterate	1	0.3
	Primary	4	1.3
	Secondary	62	20.3
	Tertiary	238	78.0
WORKING STATUS			
	Yes	186	61.0
	No	109	35.7
	Pensioner	10	3.3
WORKING SECTOR			
	Government	55	18.0
	Private	104	34.1
	Self-employment	39	12.8
	Unemployed	55	18.0
	Student	52	17.0
MONTHLY INCOME			
	<RM999	107	35.1
	RM1000 – RM2999	112	36.7
	RM3000 – RM6900	70	23.0
	>RM7000	16	5.2
PLACE OF LIVING			
	Urban	248	81.3
	Rural	57	18.7
MEDICAL ILLNESS			
	Yes	47	15.4
	No	258	84.6

Exploratory Factor Analysis

A preliminary PCA was carried out to explore the data set. The result was divided into 2 subgroups: 1) Adult immunisation perception scale and 2) Adult immunisation domain scale. The Kaiser-Meyer-Olkin (KMO) of Domain scale and Perception scale was 0.859 and 0.887 respectively with Bartlett's test of sphericity was significant at p <0.001. It showed that this data is suitable and useful to proceed with factor analysis.

Initially,8 components with eigenvalues above 1.0 were generated in Domain scale whereas 7 components generated in Perception scale. A total of 15 constructs were not exhibited an unacceptable reliability alpha of 0.7, as well as the items representing five other constructs also failed to be theoretically meaningful. The deleted item in Domain scale and Perception scale are shown in Tables 2 and 3.

Table 2: The initial factors extraction by the EFA using PCA extraction method with promax rotation and reliability analysis of each construct.

ITEM	MEAN (±SD)	PERCEIVED SUSCEP-TIBIITY	PERCEIVED SEVERITY	PERCEIVED BENEFITS	PERCEIVED BARRIERS	CUES 1	CUES 2	ITC	IIC	CRON-BACH ALPHA
F1i	6.01 (2.363)	0.967						0.796	0.58-0.85	0.865
F1ii	5.97 (2.255)	0.942						0.824	0.62-0.85	
F1iii	6.18 (2.228)	0.683						0.623	0.58-0.62	
F1iv	**6.12 (2.303)**								**Item deleted**	
F2i	5.55 (2.393)		0.777					0.769	0.59-0.89	0.934
F2ii	5.68 (2.290)		0.804					0.836	0.62-0.89	
F2iii	5.49 (2.416)		0.921					0.816	0.63-0.80	
F2iv	5.64 (2.402)		0.938					0.841	0.65-0.80	
F2v	5.92 (2.411)		0.904					0.833	0.64-0.80	
F2vi	5.53 (2.576)		0.823					0.727	0.59-0.69	
F3i	7.24 (2.300)			0.891				0.686	0.57-0.67	0.905
F3ii	7.41 (1.972)			0.824				0.833	0.66-0.78	
F3iii	7.60 (1.873)			0.850				0.837	0.67-0.79	
F3iv	7.40 (1.936)			0.805				0.777	0.57-0.77	
F4i	7.83 (2.205)				0.812			0.657	0.44-0.64	0.829
F4ii	7.41 (2.420)				0.798			0.636	0.48-0.64	
F4iii	**5.89 (2.658)**								**Item deleted**	
F4iv	**5.30 (2.642)**								**Item deleted**	
F4v	7.50 (2.397)				0.789			0.632	0.44-0.67	

F4vi	7.90 (2.232)				0.839			0.693	0.48-0.67	
F5i	**7.89 (2.320)**								**Item deleted**	0.885
F5ii	6.88 (2.054)					0.554		0.540	0.39-0.50	
F5iii	6.71 (1.887)					0.837		0.715	0.46-0.74	
F5iv	6.37 (1.880)					0.758		0.636	0.43-0.74	
F5v	7.52 (1.947)					0.730		0.746	0.43-0.79	
F5vi	7.24 (2.143)					0.886		0.817	0.45-0.86	
F5vii	7.26 (2.133)					0.869		0.742	0.39-0.86	
F6i	7.09 (2.451)						0.690	0.531	0.39-0.48	0.824
F6ii	7.31 (2.171)						0.758	0.621	0.39-0.55	
F6iii	6.56 (2.286)						0.836	0.627	0.43-0.52	
F6iv	7.44 (2.075)						0.742	0.639	0.41-0.58	
F6v	7.70 (2.008)						0.658	0.659	0.46-0.58	

Table 3: The initial factors extraction by the EFA using PCA extraction method with promax rotation and reliability analysis of each construct.

ITEM	MEAN (SD)	HEALTH BELIEVE	PAST EXPERIENCE	ATTITUTE	GENERAL KNOWLEDGE	ITC	IIC	CRONBACH ALPHA
B2i	4.51 (1.892)	0.633				0.297	0.16-0.29	0.571
B2ii	6.66 (2.566)	0.711				0.502	0.22-0.48	
B2iii	5.02 (2.420)	0.629				0.238	0.16-0.22	
B2iv	**5.21 (2.317)**						**Item deleted**	
B2v	6.46 (2.772)	0.645				0.412	0.16-0.48	
C1i	8.57 (1.787)		0.859			0.738	0.49-0.78	0.874
C1ii	8.44 (1.951)		0.888			0.765	0.58-0.78	
C1iii	**7.40 (2.127)**						**Item deleted**	
C2i	8.70 (1.750)		0.863			0.754	0.61-0.68	
C2ii	8.38 (2.027)		0.783			0.655	0.49-0.68	
C2iii	**7.48 (2.084)**						**Item deleted**	
E1	**6.32 (2.832)**						**Item deleted**	0.706
E2	6.94 (2.066)			0.734		0.557	0.32-0.58	

E3	7.42 (1.906)			0.557		0.593	0.32-0.58	
E4	6.46 (2.534)			0.865		0.389	0.24-0.37	
E5	**7.28 (2.212)**						**Item deleted**	
E6	7.38 (2.125)			0.500		0.407	0.24-0.43	
D1	7.85 (1.800)				0.901	0.779	0.45-0.78	0.941
D2	7.84 (1.808)				0.885	0.768	0.40-0.74	
D3	7.96 (1.727)				0.844	0.765	0.48-0.75	
D4	7.86 (1.882)				0.892	0.802	0.51-0.75	
D5	8.14 (1.806)				0.755	0.774	0.48-0.71	
D6	**7.28 (2.194)**						**Item deleted**	
D7	**6.81 (2.187)**						**Item deleted**	
D8	**6.04 (2.901)**						**Item deleted**	
D9	8.22 (1.796)				0.622	0.717	0.47-0.65	
D10	**3.82 (2.536)**						**Item deleted**	
D11	8.07 (1.889)				0.712	0.671	0.40-0.66	
D12	7.85 (1.862)				0.852	0.786	0.51-0.88	
D13	7.87 (1.780)				0.884	0.829	0.49-0.88	
D14	7.61 (1.866)				0.684	0.697	0.44-0.70	
D15	7.94 (1.772)				0.650	0.598	0.44-0.55	

Note:

- Initial total items were 64, 13 items were deleted during EFA. Only 51 items left for CFA.
- The item with bold text was removed from being included in the CFA

To further ensure that the EFA process to be accurate, the scale of reliability analysis of those 10 constructs were performed to the remaining 51 items which had factor loading >0.4. The reliability test showed that the ITC and IIC values of each item towards their respective constructs were acceptable except for items B2i and B2iii. However, this item remained since it has good factor loading (>0.6) with an acceptable Cronbach Alpha value of 0.57. Scale reliability was 0.89 with good subscale reliability ranging from 0.57 to 0.94 (Table 2 and 3).

Confirmatory Factor Analysis

The CFA was performed to test the exploratory factor structure using AMOS software. CFA was conducted on the 51 items identified in the exploratory data set and was found to provide an acceptable, but relatively poor fit based on the goodness of fit statistics: $\chi 2/df=2.674$ (n=305) = $p<0.001$, CFI=0.810, IFI=0.811, TLI=0.800 and RMSEA=0.074 (Figure 1).

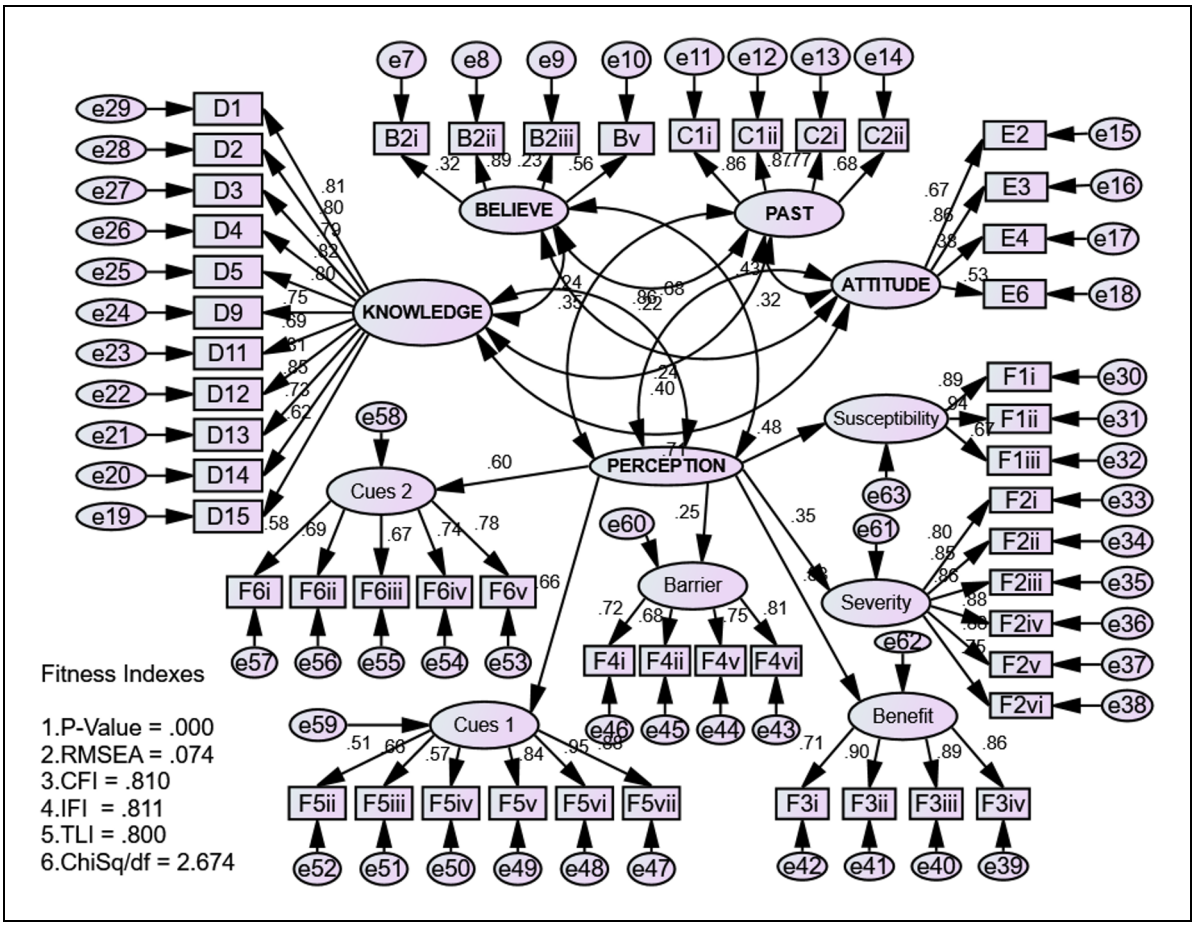

Figure 1: The path analysis of the CFA showing standardized estimates of the correlations between the five second order constructs (ellipse), six first order constructs (ellipse) and the fifty-one items (rectangle), and their respective residuals (circle). The numbers on the double headed arrows indicate the calculated correlation values by the path analysis.
Note: Certain fitness indexes do not achieve the required level. Upon examination, items B2i, B2iii, E4, F5ii, F5iv had low factor loading and item deleted.

According to Zainudin, 2012, a discriminant validity which other criteria for measurement model, the items must be free from redundancy. Any identified items with a high value of modification index (MI) were either deleted or constrained as “free parameter estimate”. The measurement model was run again after MI assessment was carried out since fitness index still not acceptable even after removing items with low factor loading. Finally, the result showed a significant improvement, and fit the 45-item model over the 51-item model, better chi-squared value, and goodness of fit statistics. The shown model was estimated against the recent data sets and produced $\chi 2/df=1.943$ (n=305) =p<0.001, CFI=0.908, IFI=0.909, TLI=0.901 and RMSEA=0.056 (Figure 2). Strong factor loadings were found across the 45 items, ranging from 0.53 to 0.94 (Table 4).

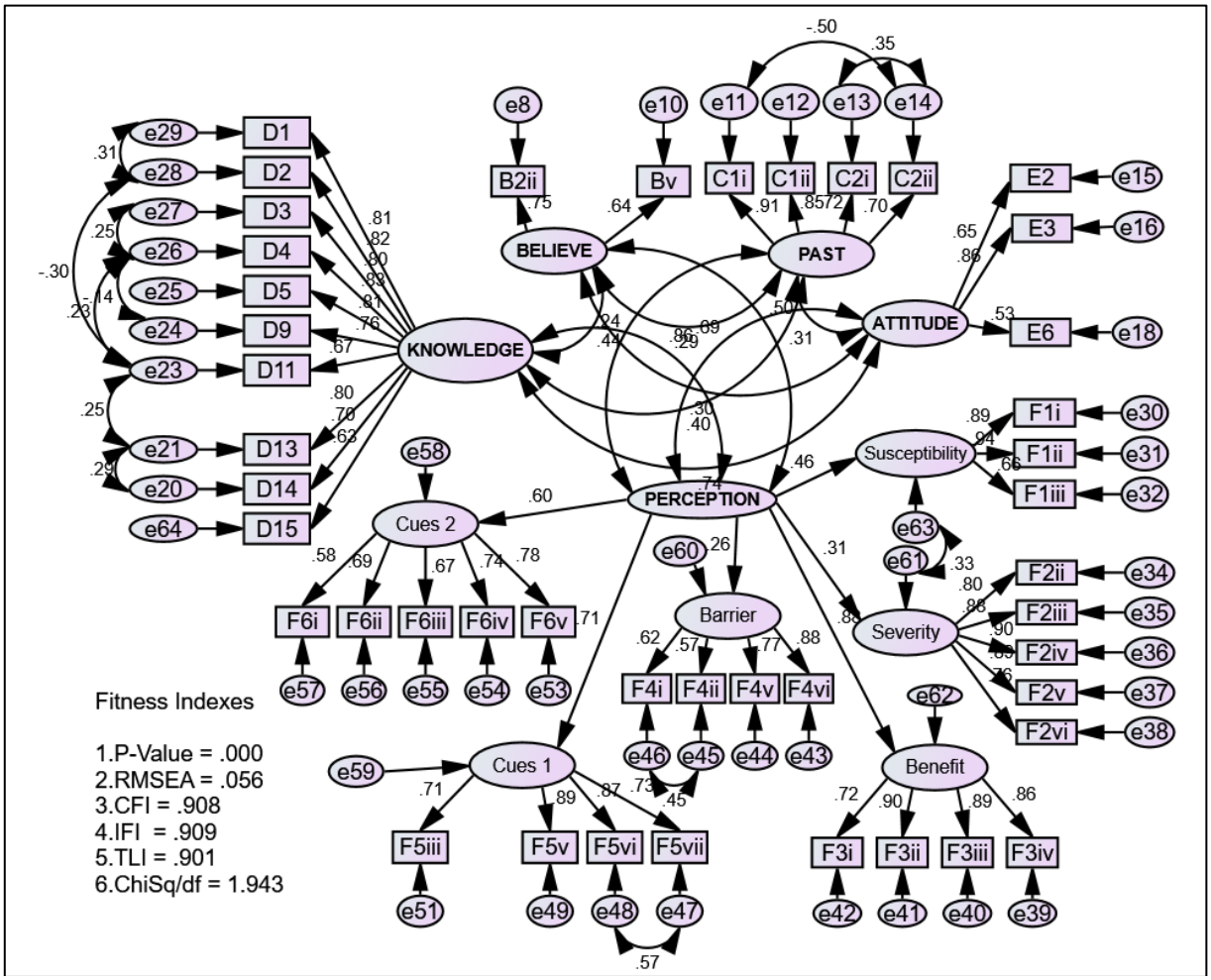

Figure 2: The final measurement model of Adult Immunisation Perception Questionnaires (AIP-Q)

Another crucial requirement of discriminant validity is the value of correlation between exogenous constructs must not >0.85 (Zainudin, 2012). Four out of five factors were managed to get out correlation values below 0.85 but only one factor just having slightly above the limit value which is between Knowledge and Perception (0.86). Overall, the exogenous constructs were not redundant or had a multicollinearity issue. Figure 2 explains the five domains; assumed to cause variation and covariation in the measurement of perception. There is a double-headed arrow between the five domains, indicates that the five domains are correlated.

Table 4: The CFA report for every construct in the measurement model with factor loadings of each item towards respective domain- Average Variance Extracted and Composite Reliability.

CONSTRUCT	ITEM	FACTOR LOADING	CRONBACH ALPHA	COMPOSITE RELIABILITY (CR)	AVERAGE VARIANCE EXTRACTED (AVE)
Health Belief	**B2i** B2ii **B2iii** B2v	**Item deleted** 0.75 **Item deleted** 0.64	0.645	0.65	0.49
Past Experience	C1i C1ii C2i C2ii	0.91 0.85 0.72 0.70	0.871	0.88	0.64
Attitude	E2 E3 **E4** E6	0.65 0.86 **Item deleted** 0.53	0.699	0.73	0.48
Knowledge	D1 D2 D3 D4 D5 D9 D11 D13 D14 D15	0.81 0.82 0.80 0.83 0.81 0.76 0.67 0.80 0.70 0.63	0.933	0.93	0.59
PERCEPTION	P. Susceptibility P. Severity P. Benefit P. Barrier Cues to Action 1 Cues to Action 2	0.46 0.31 0.88 0.26 0.71 0.60		0.67	0.33
Perceived susceptibility	F1i F1ii F1iii	0.89 0.94 0.66	0.865	0.88	0.70
Perceived Severity	**F2i** F2ii F2iii F2iv F2v F2vi	**Item deleted** 0.80 0.88 0.90 0.89 0.76	0.925	0.93	0.72
Perceived Benefit	F3i F3ii F3iii F3iv	0.72 0.90 0.89 0.86	0.900	0.91	0.72
Perceived Barrier	F4i F4ii F4v F4vi	0.62 0.57 0.77 0.88	0.827	0.81	0.52
Cues to Action 1	**F5ii** F5iii **F5iv** F5v F5vi F5vii	**Item deleted** 0.71 **Item deleted** 0.89 0.87 0.73	0.894	0.88	0.65
Cues to Action 2	F6i F6ii F6iii F6iv F6v	0.58 0.69 0.67 0.74 0.78	0.819	0.82	0.48

Cronbach's alpha for the AIP-Q was beyond 0.6 in all domains, representing adequate level of internal consistency. Table 4 showed that internal consistency for all factors is supported by composite reliability (CR) and the average variance extracted (AVE). In order to achieve the CR, the value should be >0.6. As for AVE, it indicates the average percentage of variation explained by the measuring item for a latent construct. The value of AVE must be >0.5 for every individual construct.

DISCUSSION

Immunisation can prevent infectious diseases, decrease morbidity as well as mortality of some diseases. At present, there are 26 infectious diseases that can be protected by vaccines (Andre, 2003). Nevertheless, adult immunisations often remain under-utilized when most of them consider those vaccines are recommended but not required (US Report, 2000). Several factors influenced the immunisation perception in adult population. By recognizing the factors and groups that give unsatisfactory feedback in adult immunisation, appropriate communications and delivery of messaging can be tailor specifically to those groups.

Numerous tools for assessing knowledge, attitude and perception about immunisations have been established in many countries at different times (Rashwan et al.,2011; Antoinette et al.,2012). By using these tools and/or comparing them with few research, it can provide interesting results but it must be done with careful supervision. It is due to many factors that can influence knowledge, attitudes, and their perception regarding adult immunisation where it should be taken into consideration, such as their different socioeconomic background, cultural and religious beliefs of different populations, epidemiological differences, and policy support (Ammar et al.,2014).

The developed questionnaire (in the English language) was translated into Bahasa Melayu, the common spoken language of Malaysians. The skilful bilingual translator then certified that the translation was precise and correct by review on both versions (English and Malay). The development and validation of the original items made the questionnaire relatively simple and practical to use among the Malaysian population.

Ten points Likert scale were used in this questionnaire compared to normal 5 or 7 points. According to Zainudin et al., 2015, to determine how much agree or disagree of the respondent towards particular questions, the long scale such as 10 points is way better than the short scale. The scale of measurement is supposedly reflecting the actual intention of the respondent towards the question submitted. Since this study is using SEM for validation, both measurement and structural models can be assessed successfully with 10 points of Likert scale in determining the construct validity.

The statistical indices from SEM were used for a final version questionnaire which consists of 45 items in order to get a suitable degree of reliability and validity (Hafizah et al.,2002). The Malay version of AIP-Q from this study also indicate that it has acceptable psychometric properties to measure the knowledge, attitude, and perception among adult population in Malaysia regarding immunisation.

The overall observations were adequate; ensuring stability during the EFA, where its able to produce usable results from 64 items to 51 items. According to William et al.,2012, it is considered necessary for the item to have a rotated factor loading of at least 0.4 (meaning >+0.4 or <−0.4) to make it significant. Therefore, if the item was shown not to have validity even after some additional criteria had been measured, the items were eliminated if the factor loading constantly less than 0.4 (Costello, 2009). Since there was no previous model to test against this model, absolute fit indices were used in this study (Schermelleh et al.,2003).

The CFA is a method to identify certain variables that belongs to certain factors and it is likely to identify further which factor items are loaded to. Meanwhile, factor analysis allows the factor scores to be explained by common factors which only contain variance (Williams, 2012). Thus, the effect of measurement error can be removed by calculating the factor scores and putting them into path analysis, Fortunately, this is the principle of SEM which offers several advantages in performing CFA (Schermelleh et al.,2003).

The reliability testing was higher than acceptable values indicate that an acceptable internal consistency was observed in the full model of AIP-Q. The reliability assessment of every construct based on Cronbach's alpha, AVE and CR shows acceptable internal consistency tested among adult population.

The reasons of good internal consistency in most of the factors could be due to respondent had a good understanding of the item (Hair et al.,2010; Tabachnik & Fidell, 2001), hence less random error.

Several strengths were recognized throughout this validation. Preliminary evidence shows its initial reliability and validity towards developing a new questionnaire among Malaysian concerning perceptions towards adult immunisations. Even though there are few existing questionnaires already developed based on the five-health belief domains, but this questionnaire is a new tool covering the whole spectrum of adult immunisation and design specifically for a Malaysian population. It is essential to find out their perceptions in general rather than specific vaccination since most of Malaysians had minimal exposure to adult immunisation. Therefore, this new questionnaire fills a gap of knowing their knowledge, attitude, and perceptions towards adult immunisation.

There are few limitations in this validation study which is lack of test-retest reliability assessment of the instrument and it remains to be further tested in future studies. Besides, no concurrent validity evaluation to show its correlation to other measures, such as the health behaviour measure. They might be a connection of recorded vaccine uptake with the immunisation perception which need to be prioritized in future studies. Meanwhile, perceptions may change over the time and represent a snapshot of the study period. Hence, search for respondents who are very similar can be done, but for one specific domain or variable could be difficult to find.

CONCLUSION

The self-administered Adult Immunisation Perception-Questionnaire (AIP-Q) is a valid and reliable instrument for providing psychometric properties. It is a valid measurement for components of health belief, experience, knowledge, attitude, perceived severity, perceived susceptibility, perceived benefits, perceived barriers, and cues for action. This questionnaire should provide a useful tool to measure the perceptions of adult immunisation among Malaysian population with age group 18 and above.

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List of Abbreviation

Adult Immunisation Perceptions-Questionnaire (AIP-Q)
Exploratory factor analysis (EFA)
Confirmatory factor analysis (CFA)
Principal Component Analysis (PCA)
Goodness of Fit Indexes (GFI)
Modification indices (MI)
Comparative Fit Indexes (CFI)
Inter Total Correlation (ITC)
Composite reliability (CR)
Inter Item Correlation (IIC)
Root mean square error of approximation (RMSEA)
Average variance extracted (AVE)
Vaccine-Preventable Diseases (VPD)
Structural Equation Modelling (SEM)

Conflicts of Interest

The author declares no conflicts of interest.

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