

## Reliability and Construct Validity of Knowledge, Attitude and Practice on Dengue Fever Prevention Questionnaire

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### Abstract

*Dengue fever is not just a disease but it is a worldwide phenomenon. Knowledge on dengue prevention is helpful to save life but a practice of knowledge among people to stop dengue fever is a lively issue among scholars. These viruses usually transmitted by Aedes aegypti and Aedes albopictus. The aim of this study was to assess the reliability and construct validity of Knowledge, attitude and practice of dengue fever prevention in Malaysia, especially in Perak state. A cross-sectional study and designed to validate the Knowledge, Attitude and Practice on dengue fever questionnaire in Perak Tengah District, Perak. Forty three items of the knowledge, attitude and practice questionnaire were designed based on the literature and expert opinions. The items on the questionnaire developed for this study were divided into four main sections which are demographic, knowledge, attitude and practice. Reliability was determined using Cronbach's alpha for internal consistency where the construct validity was assessed using exploratory factor analysis using principal component with varimax rotation. The results indicate that the Cronbach's alpha coefficients showed acceptable and satisfactory internal consistencies. Cronbach's alpha coefficients for knowledge and practice were 0.968 and 0.790, respectively and therefore confirming the adequacy of the internal consistencies of these scales. However, the internal consistency for attitude scale was the lowest of the three domains (cronbach's alpha = 0.638). The results of the validation study suggested that the KAP scales on dengue fever prevention are valid and reliable for assessing knowledge, attitude and practice in Malaysia especially in Perak state.*

**Keywords:** Knowledge; Attitude; Practice; Dengue; Fever; Aedes; Perak

### Introduction

Dengue is a mosquito-borne infection that had become a major public health concern. It is a disease found in most tropical and subtropical areas of the world and had become the most common arboviral disease of human. Dengue fever is an acute febrile disease due to a viral infection and presents with severe headache, pain in the eyes, high fever, backache, vomiting, muscle and joint pain as well as rash. It also known as Dengue Haemorrhagic Fever. Dengue is caused by the infection of dengue virus, a flavivirus in the family of Togaviridae (Hairi F et al., 2003). There are four known virus serotypes which immunologically related, there are DEN 1, DEN 2, DEN 3 and DEN 4 (World Health Organization). These are belong to the Flaviridac family (Gubler, 1998). Dengue fever has emerged as an important public health problem in Malaysia as it has become endemic throughout the country, so primary prevention is needed. Primary prevention is health education and community participation, thus it is an important strategy part to combat dengue. Knowledge, attitude and practice survey provide a suitable format to evaluate existing health programs.

Finding from this study would provide useful baseline information, which could improve on the educational programs and also the monitoring and evaluation of the dengue prevention and control programs (Hairi F et al., 2003). An educational intervention seeks to increase knowledge, attitude and practice of dengue fever prevention should allow people or residents in Malaysia to understand the nature of the disease and factors that can cause an attack (Martinez & Sossa, 2005). Therefore, a validated and reliable instrument that is sensitive to change in knowledge, attitude and practice of dengue fever is required to assess the psychosocial dengue fever in Malaysia. The purpose of the study was to assess the reliability and construct validity of Knowledge, attitude and practice of dengue fever prevention in Malaysia, especially in Perak state.

## ***Material and Methods***

### ***Study Design and Sample Size***

This study was cross-sectional and designed to validate the Knowledge, Attitude and Practice on dengue fever questionnaire in Perak Tengah District, Perak. It was piloted to residents outside Perak Tengah District, Perak. Residents outside Perak Tengah District were selected at their home by trained data collector. All the respondents included in this study gave written informed consent before participating in the study. Self administered questionnaires were distributed to 58 respondents, based on sample size calculated using  $ssalpha$  command using STATA program (L. Naing, Winn, & Rusli, 2006) to obtained 95% lower bound confidence interval of alpha 0.73. The sample size obtained were inclusive with 10% estimated missing data (N. N. Naing, 2009). To ensure the completeness of the questionnaire, the trained data collector have checked and returned questionnaire onsite. The response rate was 100%. It took around 15 minutes to complete one questionnaire.

### ***Questionnaire***

Forty three items of the knowledge, attitude and practice questionnaire were designed based on the literature and expert opinions. The items on the questionnaire developed for this study were divided into four main sections: 1) demographic factors: which intended to discover the demographic and socio economic characteristics. 2) Knowledge: defined as respondent's knowledge about dengue fever prevention including possible cause of dengue fever recurrence, symptoms, transmission, treatment and prevention, necessity of dengue precaution and recommended/non-recommended practice of action. This domain consisted of sixteen true/false with "don't know" category provided for each question. Correct answers received one point; incorrect and 'don't know' answers received zero point. 3) Attitude: defined as respondent's opinions about dengue fever prevention, awareness, daily care and socio-cultural perspective. This domain contain fourteen items of agree/disagree with "don't know" category in each question. The acceptable good attitude responses by respondent were awarded by one point and else zero point. 4) Practice: defined as respondent's practice towards dengue fever prevention such as action taken to avoid dengue fever occurrence. This domain consists thirteen items assessed by yes/no and "do not have" category. The score were given based on the good practice and none for poor practice. If "do not have" answered by respondents, it will not count into the cumulative score and the total score (denominator) were also reduced. Data from the knowledge, attitude and practice domains were respectively summed into a percentage score to treat the variable as continuous data.

### ***Statistical Analysis***

Data entry and analysis was done using the SPSS version 20.0 (IBM SPSS Statistics, 2012) and Stata/SE version 11.2 (StatCorp, 2009). Mean and standard deviations were calculated for continuous variables, frequencies and percentages for categorical variables. To determine whether the instrument presented in simple structure or multidimensional structure, a factor analysis with principal components method were applied with orthogonal rotation (Abdi, 2003; Brown, 2009a). Internal consistency was evaluated using cronbach's alpha coefficient of the instrument including Spearman's rank correlation for item analyses were also carried out (Edimansyah, Rusli, Naing, & Mazalisah, 2006; Huang, Huang, & Thomas, 2006; Martinez & Sossa, 2005).

### ***Results***

A total 58 respondents participated in this study. Table I describes the demographic characteristics of the study population. Most of the respondents are Malay and predominant by females. The mean age was 28.43 ( $\pm 9.54$ ) years old. The median income per month was Ringgit Malaysia (RM) 3000 with IQR (11.50). A higher proportion of respondent's educations were diploma and majority of them do heard about dengue fever (94.8%).

Out of these, four (4) of them have been infected by dengue fever. The colossal source of information about dengue were newspaper (91.4%) followed by television (79.3%) and poster or flyers (69.0%).

**Table I: Socio-demographic characteristics of knowledge attitude and practice on dengue fever prevention**

Variable	n (%)	Mean (SD) <sup>a</sup>	Median (IQR) <sup>b</sup>
Age		28.43 (9.54)	
Income			3000.00 (11.50)
<b>Gender</b>			
Male	25 (43.1)		
Female	33 (56.9)		
<b>Race</b>			
Malay	55 (94.8)		
Others	3 (5.2)		
<b>Educational Level</b>			
Less than Diploma	8 (13.8)		
Diploma	35 (60.3)		
Bachelor Degree	15 (25.9)		
<b>Ever heard about dengue?</b>			
No	3 (5.2)		
Yes	55 (94.8)		
<b>Source of information</b>			
Newspaper	53 (91.4)		
Radio	38 (65.5)		
Friends	32 (55.2)		
Poster	40 (69.0)		
Health center	35 (60.3)		
Magazine	25 (43.1)		
Family	28 (48.3)		
School	25 (43.1)		
Television	46 (79.3)		
Internet	26 (44.8)		
Doctor	20 (34.5)		

<sup>a</sup>SD = standard deviation; <sup>b</sup>I.Q.R = inter quartile range

### **Reliability (Internal Consistency)**

Table II, III and IV shows the results of item-total correlations and Cronbach's alpha coefficients for all items of knowledge, attitude and practice on dengue fever prevention. The Cronbach's alpha were used to assess the internal consistency for each domains (Huang et al., 2006). Besides, spearman's rank correlation was used to examine item-total correlations for each domain. The value for item-total correlations more than 0.3 can be indicate as good correlation (Nunnally & Bernstein, 1994). Based on table 2, values for all item-total correlations for knowledge scale were greater than 0.539 (range: 0.539 to 0.940) which indicating that each scale of the items had good correlation with the other items comprising the overall scale score. Whereas, the values of attitudes and practices domain scales were moderate (Edimansyah et al., 2006) which internal consistencies of the item-total correlations were more than 0.247 for attitude domains and more than 0.259 for practice domain. On the whole, the Cronbach's alpha coefficients were acceptable for knowledge (0.968), attitude (0.638) and practice (0.790).

**Table II: Internal consistency of knowledge domain items (N=58)**

Variable code	Item	Corrected item-total correlation	Cronbach's alpha
B1	Dengue fever is a viral disease spread by the bite of the mosquito Aedes aegypti or Aedes albopictus.	0.917	
B2	A person can be infected with dengue fever more than once.	0.838	
B4	Dengue fever is a severe flu-like illness, which affects infants, children and adults.	0.553	
B5	The rainy season is the only season outbreak of dengue infection.	0.539	
B6A	High fever	0.940	
B6B	cough	0.646	
B6C	Sore bones, muscles and joints.	0.811	
B6D	Pain in the back of the eye	0.633	
B6E	Vomit	0.738	
B6F	Less Appetite	0.901	0.968
B6G	Rash	0.746	
B6H	Headache	0.887	
B9	Aedes breed in stagnant clear water from old tires, trash cans and flower pots.	0.918	
B10	Dengue viruses transmitted to humans by the bite of female Aedes mosquitoes have been infected.	0.838	
B11	The only method of controlling dengue virus infection is to combat the vector mosquitoes (Aedes).	0.704	
B14	Killer larvae can be beneficial in killing mosquito larvae.	0.899	
B15	Container or drinking water tank without lid should be cleaned every seven (7) days.	0.852	
B16	Insecticides such as (Shieldtox, Ridsect, etc.) can kill adult mosquito.	0.653	

**Table III: Internal consistency of attitude domain items (N=58)**

Variable code	Item	Corrected item-total correlation	Cronbach's alpha
C3	The only method of controlling or preventing dengue is to eliminate Aedes mosquitoes.	0.417	
C5	Everyone has a chance to dengue virus.	0.375	0.638
C6	If I experience signs and symptoms of dengue fever, I would immediately see a doctor.	0.586	
C7	I feel scared when infected with dengue fever.	0.247	
C14	You are the key individuals in preventing dengue.	0.497	
C10	All dengue patients have a chance for a full recovery.	0.391	

**Table IV: Internal consistency of practice domain items (N=58)**

Variable code	Item	Corrected item-total correlation	Cronbach's alpha
D1	Do you immediately close the water container after using it?	0.259	
D3	If there Aedes mosquito larvae in the water tank, have you done anything to get rid of it?	0.352	
D4	Do you change the water plant containers in the house every week?	0.383	
D5	Have you change the water in flower containers?	0.581	0.790
D6	Have you check mosquito larvae in a flower pot?	0.613	
D7	Did you check the waste / garbage can block the flow of water around your home?	0.685	
D8	If yes, have you put it in the trash or dispose of it?	0.639	
D11	Do you participate in any of the dengue infection campaign in your area?	0.290	
D12	Have you check the Aedes mosquito larvae in toilet tank?	0.466	
D13	Did you check and clean the drains / gutters roofs of the rainy season?	0.427	

**Reliability (Factor Analysis)**

The Kaiser-Meyer-Olkin test (0.721) and the Bartlett test of sphericity (chi-squared,  $df = 1877.50, 561$ ;  $p$ -value  $< 0.001$ ) showed that the data met the criteria required for factor analysis (Martinez & Sossa, 2005). There are three potential factors that explained 56% of the variance was identified. Orthogonal rotations were employed because none of the correlations exceed the Tabachnick and Fidell threshold (Tabachnick & Fidell, 2007) of 0.32 (Brown, 2009b). The Principal Component with Varimax method for orthogonal rotations was used to find the related factors inter items. Table V showed that the first factor included items related to knowledge about dengue fever prevention, a second factor included items related to attitude towards dengue fever, and last factor comprise items related to practice towards dengue fever prevention.

**Table V: Exploratory Factor Analysis of Items in the knowledge, Attitude and Practice on Dengue Fever Preventions Using Principal Component Extraction with Varimax Rotation**

Scale	Items	Loading on 3 Factors		
		Factor 1	Factor 2	Factor 3
Knowledge	B1	0.933		
	B2	0.855		
	B4	0.598		
	B5	0.594		
	B6A	0.959		
	B6B	0.664		
	B6C	0.833		
	B6D	0.641		
	B6E	0.783		
	B6F	0.915		
	B6G	0.759		
	B6H	0.914		
	B9	0.925		
	B10	0.856		
	B11	0.758		
	B14	0.917		
B15	0.868			
B16	0.700			
Attitude	C3		0.490	
	C5		0.731	
	C6		0.870	
	C7		0.730	
	C10		0.516	
	C14		0.687	
Practice	D1			0.405
	D3		0.433	
	D4			0.685
	D5			0.649
	D6			0.740
	D7			0.705
	D8			0.666
	D11			0.283
	D12			0.453
	D13			0.582

Only items with factor loading  $> 0.30$  are shown. Factor 1 indicates Knowledge; factor 2, Attitude; factor 3, practice. The 3 factors that are probably present among the items together explain 56% of the total variance in the results.

### **Validity**

During the process of questionnaire development, content validity was established by defining concepts and their associated items based on social cognitive theory with its components including behavior capability, self-efficacy and management of emotional arousal (Huang et al., 2006). Perhaps, it also based on others related study (Hairi et al., 2003; Ibrahim, Al-Bar, Kordey, & Al-Fakeeh, 2009; Nalogsack, Yoshida, Morita, Sosouphanh, & Sakamoto, 2009; Syed et al., 2010; Wan-Rozita et al., 2006). Second, the expert's opinions about the content validity were also done and lastly the questionnaire face validity was also done by giving training to the interviewers. These procedures were used to improve the validity and feasibility of the questionnaire (Huang et al., 2006).

### **Discussion**

The present study is an attempt to validate the psychometric properties of knowledge, attitude and practices on dengue fever prevention at Perak Tengah district, Perak, Malaysia. The selected scales in the knowledge, attitude and practices showed acceptable and satisfactory internal consistencies. Cronbach's alpha coefficients for knowledge and practice were 0.968 and 0.790, respectively and therefore confirming the adequacy of the internal consistencies of these scales. However, the internal consistency for attitude scale was the lowest of the three domains (cronbach's alpha = 0.638) but nearly same with study in Male, Maldives (Ahmed, 2007). The results of exploratory factor analysis showed that three factors were clearly associated with the dimensions of knowledge, attitude and practice. Our results show that the first factor was associated with all items in knowledge domain. Besides, others two factors were also associated with all items in attitude and practice, respectively. However, there was one item which suppose into practice domains was in the attitude domain. In conclusion, this study demonstrated that the three scales of knowledge, attitude and practice were reliable and valid for assessing the dengue fever prevention in Malaysia, although further analysis need to improve the attitude scale.

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