

FACTORS ASSOCIATED WITH KNOWLEDGE AND ATTITUDE ON PREVENTION OF DENGUE FEVER AMONG INTERNATIONAL POSTGRADUATE STUDENTS IN A MALAYSIAN UNIVERSITY

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ABSTRACT

Background: Dengue fever is a continuing public health burden globally, including Malaysia. Dengue fever has also become a burden among students who migrate to dengue endemic countries.

Method: This cross-sectional study aimed to determine the associated factors of knowledge and attitude on prevention of dengue infection among international postgraduate students in a university in Malaysia. Descriptive and analytic statistics were used to analyze the data collected through structured questionnaire. Chi-Square/Fisher's exact test and binary logistic regression was used to analyze the association and the predictors respectively. Level of significance was set at P less than 0.05.

Results: A total of 327 international students participated with 93.4% response rate. Most of the students were male (70.3%), single (51.1%) and Asians (52.3%) with median age of 32 (IQR 10). Most of the respondents showed good knowledge (69.7%) and positive attitude (51.4%) towards prevention of dengue. Predictors of knowledge were being a female (aOR = 2.236, $P = 0.007$), previous history of dengue infection (aOR = 12.751, $P = 0.007$), longer duration of stay in Malaysia (aOR = 2.005, $P = 0.007$) and high influence of mass media (aOR = 3.076, $P = <0.001$). Predictors of positive attitude were, older age (aOR = 1.718, $P = 0.024$), higher perceived influence of mass media (aOR = 2.236, $P = 0.007$) and living in dengue endemic country (aOR = 1.796, $P = 0.031$).

Conclusion: Knowledge and attitude of international students on prevention of dengue fever should be strengthened. The mass media should be optimally utilized as an influential source of information and health education regarding dengue infection.

Key Words: Dengue fever, International postgraduate students, Knowledge, Attitude

1.0 Introduction

The global incidence of dengue infection increases exponentially every 10 years between 1990 to 2013, with an estimated incidence range of 50 million to 100 million cases per year (WHO, 2016). Dengue was also responsible for 1.14 million (95% CI, 0.73 million – 1.98 million) disability-adjusted-life-years (DALY) in 2013 (Stanaway et al., 2016) out of which Asia alone bore 70% of this burden (Bhatt et al., 2013). It is estimated that up to 75% of the population living in the Asia-Pacific region are potentially exposed to the disease (WHO, 2012). In Southeast Asia, it was estimated that an overall annual economic burden of dengue from 2001 to 2010 was US\$ 950 million (US\$ 610 million – US\$ 1,384 million) (Shepard, Undurraga, & Halasa, 2013).

The dengue situation in Malaysia is a national health threat to the public due to a tremendous increase in incidence during the last two decades (Mia, Begum, Er, Abidin, & Pereira, 2013). In the year 2000, the incidence rate was 31.6 /100,000 population which escalated to 396.4/100,000 population in 2015 (Ministry of Health, 2016).

Dengue infection is also one of the top public health problems among individuals travelling to endemic areas (Ferguson, Henderson, Lee, & Jung, 2016) and the leading cause of febrile illness among international travelers (Ratnam, Leder, Black, & Torresi, 2013), which accounts for 2% of overall illnesses in travelers returning from dengue-endemic areas (Wilder-Smith, 2013). In Malaysia, there has been a massive influx of international students accounted to more than 93,000 international students from over 100 countries 2011. It was identified that one of the contributing factors for the widespread dengue infection in Malaysia is attributed to the influx of newcomers with poor knowledge and attitude on dengue fever prevention (Wong YM & Zainal Abidin, 2013). Moreover, the overall prevalence of dengue fever in Malaysia includes these newcomers who are studying as well as working. However, there are lack of studies regarding dengue among international students in Malaysia and this study intended to identify the factors associated with of knowledge and attitude on prevention of dengue infection among international students.

2.0 Materials and Methods

This is a cross-sectional study conducted among the postgraduate international students in Universiti Putra Malaysia (UPM) who were enrolled as full-time students in academic year 2016/2017. UPM is one of the public research universities in Malaysia. Multi-stage random sampling was used. Out of a total of 1,497 students in the selected six of 16 faculties, 350 respondents were selected using simple random sampling proportionate to the number of students in each faculty. Students who were not available for valid reasons at the time of data collection were excluded.

A self-administrated paper-based questionnaire was used to collect the data. The questions were adapted from different sources based literature review (Abdullah, Azib, Harun, & Burhanuddin, 2013; Chanyasanha, Guruge, & Sujirarat, 2015; Dhimal et al., 2014). The knowledge assessment section had 22 questions where the cutoff point was based on the median score. The attitude questions had 8 items and were measured on 5-points Likert's scale and the total score was divided into two categories based on the cutoff point (80%). The total

score of perceived influence of source of information was also categorized as low (< 80%) and high (\geq 80%) influence (Chanyasanha et al., 2015).

Data were analyzed using the IBM Statistical Package for Social Science (SPSS) version 22. Descriptive statistics, Chi square test and binary logistic regression analysis were used. Permissions obtained from the deans of each selected faculty, while all respondents submitted written informed consent prior to recruitment into the study.

3.0 Result

Of 350 eligible respondents, 94% responded and returned the completed questionnaire. Table 1 shows that more than half of the respondents (51.7%) were 32 years of age and above. There were 52.3% students who were Asians and 57.8% lived in dengue endemic countries, however, only 8.6% of the students had experienced dengue fever. Most of the respondents (73.4%) used internet to search information regarding dengue infection, followed by through television/radio (44.3%) and from health personnel (41.6%).

Table1: Sociodemographic factors, knowledge and attitude among respondents (N = 327)

Variable	knowledge			Attitude		
	Good (n=228)	Poor (n=99)	P- value	Satisfactory (n=168)	Unsatisfactory (n=159)	P- value
	n (%)	n (%)		n (%)	n (%)	
Age (Median= 32 (IQR 10))						
20 -31	104 (65.8)	54 (34.2)	0.138	68 (43.0)	90 (57.0)	0.004*
32 -55	124 (73.4)	45 (26.6)		100(59.2)	69 (40.8)	
Gender						
Male	152 (66.1)	78 (33.9)	0.027*	119(51.7)	111(48.3)	0.840
Female	76 (78.4)	21 (21.6)		49 (50.5)	48 (49.5)	
Marital status						
Single	112 (67.1)	55 (32.9)	0.285	73 (43.7)	94 (56.3)	0.005*
Married	116 (72.5)	44 (27.5)		95 (59.4)	65 (40.6)	
Level of education						
Master	123 (66.8)	61 (33.2)	0.199	90 (48.9)	94 (51.1)	0.312
Ph.D.	105 (73.4)	38 (26.6)		78 (54.5)	65 (45.5)	
Nationality						
Asian	121 (70.8)	50 (29.2)	0.132	110(64.3)	61 (35.7)	<0.001*
African	104 (70.3)	44 (29.7)		56 (37.8)	92 (62.2)	
Others	3 (37.5)	5 (62.5)		2 (25.0)	6 (75.0)	
Dengue endemic country						
Yes	134(70.9)	55 (29.1)	0.588	115(60.8)	74 (39.2)	<0.001*
No	94 (68.1)	44 (31.9)		53 (38.4)	85 (61.6)	
Dengue history on respondents						

Yes	27 (96.4)	1 (3.6)	0.001 ^a	17 (60.7)	11 (39.3)	0.301
No	201 (67.2)	98 (32.8)		151(50.5)	148(49.5)	
Dengue history on family and close friends						
Yes	82 (81.2)	19 (18.8)	0.003*	56 (55.4)	45 (44.6)	0.325
no	146 (64.6)	80 (35.4)		112 (49.6)	114 (50.4)	
Duration of stay in Malaysia (in months) (Median = 18 (IQR 28))						
1-17	99 (62.3)	60 (37.7)	0.004*	71 (44.7)	88 (55.3)	0.018*
≥18	129 (76.8)	39 (23.2)		97 (57.7)	71 (42.3)	
Perceived Influence of source of information						
High (≥ 80%)	192 (75.6)	62 (24.4)	<0.001*	143 (56.3)	111 (43.7)	0.001*
Low (<80%)	36 (49.3)	37 (50.7)		25 (34.2)	48 (65.8)	

*significant at $P < 0.05$, χ^2 test; ^aFisher's exact test;

IQR-Inter Quartile Range.; Cut-off point for good knowledge ≥ 13 , Cut-off point for satisfactory attitude $\geq 80\%$.

Majority (69.7%) respondents had good level of knowledge on prevention of dengue fever. There was a higher proportion of respondents with good knowledge on dengue prevention among females as compared to among males ($P < 0.05$). In addition, good knowledge on dengue prevention were observed among those with history of dengue fever in themselves, in their family or close friends and, among those who have stayed longer in Malaysia ($P < 0.05$). Larger proportion of respondents with high perception on influence of source of information had good knowledge as compared to among those with lower perception (75.6%, 49.3% respectively, $P < 0.05$).

A large proportion (48.6%) respondents had unsatisfactory attitude. Majority of students who were older than 32 years of age (59.2%) and married (59.4%) had satisfactory attitude. There was a significant association between marital status and duration of stay in Malaysia with attitude towards dengue prevention ($\chi^2 = 8.024$, $df = 1$, $P = 0.005$; $\chi^2 = 5.598$, $df = 1$, $P = 0.018$). Satisfactory attitude was significantly higher among respondents who came from endemic countries and among Asian respondents. However, majority (61.6%) of those who were not from dengue endemic countries had unsatisfactory attitude. In addition, the perceived source of information influence was observed to have significant association with attitude.

Binary logistic regression analysis showed that being a female, history of previous dengue infection previously, those who stayed in Malaysia for more than 18 months and respondents with perceived high influence of source of information were more likely to have good knowledge on prevention of dengue (Table 2). In addition, respondents older than 31-year-old, respondents from dengue endemic country, and those who had high perceived influence of source of information, were associated with satisfactory attitude. However, African respondents were less likely to have a satisfactory attitude towards dengue infection prevention (aOR = 0.443, 95% CI = 0.262 – 0.748, $P = 0.002$) when compared to Asians.

Table 2: Associated factors of good knowledge and satisfactory attitude on prevention of dengue infection among post graduate international students (N=327)

Variables	Good knowledge			Satisfactory attitude		
	aOR	95% CI	P-value	aOR	95% CI	P-value
Age						
[20 -31]	-	-	-	1		0.024
32 -55	-	-	-	1.78	(1.074-2.747)	
Gender						
[Male]		1		-	-	-
Female	2.236	(1.242-4.025)	0.007	-	-	-
Nationality						
[Asian]	-	-	-	1		
African	-	-	-	0.443	(0.262-0.748)	0.002
Others	-	-	-	0.362	(0.064-2.035)	
Dengue endemic country						
[No]	-	-	-	1		
Yes	-	-	-	1.796	(1.055-3.055)	0.031
Dengue history on respondents						
[No]		1		-	-	-
Yes	12.751	(1.674-97.136)		-	-	-
Duration of stay in Malaysia (months)						
[1-17]		1		-	-	-
≥18	2.022	(1.207-3.385)	0.007	-	-	-
Perceived influence of source of information						
[Low]		1		1		
High	3.153	(1.784-5.572)	<0.001	2.552	(1.417-4.487)	0.002

Significant value $p < 0.05$

4.0 Discussion

More than two-thirds of total respondents had a good level of knowledge on prevention of dengue infection. This was higher compared to another similar study (Rao, Minhat, & Hayati, 2016). Gender was one of the variables that showed significant association with level of knowledge, similar with the finding in a study done in Pakistan. (Ramzan, Ansar, & Nadeem, 2015) By contrast, there was no association between gender and knowledge level reported in several studies in Colombia, Thailand and Malaysia (Abbasi et al., 2016; Takahashi, Wilunda, Magutah, & Thein, 2014; Wong, Shakir, Atefi, & AbuBakar, 2015). This could be due to the difference in study population whereby the latter studies were conducted among the general population. Being female is found to be associated with good knowledge of dengue fever. Females are more likely to take care of sick family members, thus, logically become more knowledgeable about the disease. This finding is similar to the study done in Kashmir (Vania & Randall, 2016).

Previous history of dengue infection among respondents and knowledge were also significantly associated, which is similar with a nationwide study in Malaysia (Wong et al., 2015). For obvious reasons, individuals could gain a lot of knowledge through the experience of having the disease. Our findings showed that respondents with previous history of dengue fever were 12 times more likely to have good knowledge. This corresponds with a study in Saudi Arabia (Alhazmi et al., 2016). However, other studies in Pakistan and Malaysia showed the contrary findings, (Aung et al., 2016; Itrat et al., 2008) probable reason being both the studies were done in the urban and rural areas among the general population. On the other hand, our target population in this study was educated, international postgraduate students who tend to gain knowledge from experiential learning. We noted that the wide 95% CI level for this result is probably due to the small number of respondents with history of dengue fever in the past. Therefore, this finding should be used with caution. Similar to previous studies, there was also a significant association between previous dengue infection experience among respondents' family members or close friends and knowledge of dengue fever (Ibrahim, Al-Bar, Kordey, & Al-Fakeeh, 2009; Paz-soldán et al., 2015).

Interestingly, duration of stay in Malaysia showed significant association with the international postgraduate students' level of knowledge on prevention of dengue infection, which is similar to a study in Thailand (Kyu, Thu, & Putten, 2005). The longer individuals stay in foreign countries the more they learn about the local culture and the common diseases. The international students had exposures and access to information on dengue from their interactions in the university and in their residential areas.

The respondents' perceived influence of source of information was associated with both good knowledge and satisfactory attitude on prevention of dengue infection, which is consistent with another study in Perak, a state in central peninsular Malaysia (Abdullah, Azib, Harun, & Mohd, 2013). This indicates the importance of source of information in conveying important health messages to the community.

More than 48% of respondents did not have satisfactory attitude on dengue prevention should not be neglected as they could be an obstacle for dengue prevention initiatives. In this study, age and marital status were also associated with attitude towards dengue infection which is similar to studies in Nepal (Dhimal et al., 2014) and Malaysia (Naing et al., 2011). When people get older and form a family, the perception changes especially regarding disease as individuals gain experience and become accountable for their family members. By contrast,

other studies reported that age is not associated with attitude on dengue prevention (Leong, 2014; Wallis & Lugova, 2016).

This study has some limitations. We used a cross-sectional study design where the causal relationship of the associated factors with knowledge and attitude are not able to be established. The data was collected by using self-administered questionnaire, thus, there could be information bias since the participants tend to give socially desirable answers. Besides, this study covered only international postgraduate students in one university (UPM) in Malaysia.

5.0 Conclusion and recommendation

Overall knowledge of international postgraduate students in the Malaysian public university was good, however, near to half of them did not have satisfactory attitude on prevention of dengue infection. This situation needs to be improved as an effort to prevent the occurrence of dengue fever in the university and in the students' residential areas. Awareness program should be implemented especially on new students who are younger and originate from non-endemic countries. It is recommended that some dengue related health messages and education materials be disseminated through the local institutional mass media. A peer driven health education program can also be introduced, where students who had exposure to dengue infection and coming from dengue-endemic countries can share their experience and sensitize other students on prevention on dengue fever.

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Ethical Approval

This study was approved by the Ethics Committee for Research Involving Human Subjects of Universiti Putra Malaysia (JKEUPM).

Declaration

The authors declare that there is no conflict of interest.

Authors contribution

Author 1: Research topic, draft of proposal, research activities, data analysis and draft manuscript.

Author 2: Research topic, review proposal, monitor research activities, manuscript editing.

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