Survey of Dengue Knowledge and Prevention Practices Associated with Sociodemographic Status: A Cross-Sectional Study Among the Community Living in an Urban Area of Selangor, Malays...

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SCIENTIFIC NOTE

SURVEY OF DENGUE KNOWLEDGE AND PREVENTION PRACTICES ASSOCIATED WITH SOCIODEMOGRAPHIC STATUS: A CROSS-SECTIONAL STUDY AMONG THE COMMUNITY LIVING IN AN URBAN AREA OF SELANGOR, MALAYSIA

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ABSTRACT. The present study aimed to explore the current status of knowledge and practices of dengue prevention associated with sociodemographic status among the community living in an urban area of Selangor, Malaysia. A total of 441 participants were interviewed regarding sociodemographic status, knowledge of dengue, and self-reported prevention practices. Participants over 40 years old were more likely (odds ratio [OR] = 4.210, 95% CI = 1.652–10.733, $P = 0.003$) to have better dengue knowledge. Participants whose average monthly household income was more than MYR3,000 (US$715) were more likely (OR = 1.607, 95% CI = 1.059–2.438, $P = 0.026$) to have better practices of dengue prevention measures. The finding suggests that both government and community efforts are essential in order to continue to educate about dengue and reduce the frequency of dengue cases nationwide.

KEY WORDS Dengue, practice, knowledge, sociodemographic urban community

Dengue is one of the most prevalent public health issues in tropical and subtropical countries. Over the decades, dengue has flourished dramatically, with approximately 50% of the global population (>2.5 billion people) at risk of infection (WHO 2019). Transmitted by *Aedes aegypti* (L.) and *Ae. albopictus* (Skuse), dengue can occasionally develop into a severe dengue stage known as dengue hemorrhagic fever, which can cause severe complications and potential death in humans (Mohapatra and Aslami 2016). At present, no specific medications are available to cure the disease.

Earlier studies found that individuals with little knowledge of dengue demonstrated fewer prevention practices compared with individuals with more knowledge of dengue (Chandren et al. 2015, Wong et al. 2015). In contrast, other studies showed no significant association between knowledge of and practices for dengue (Hairi et al. 2003, Yboa and Labrague 2013). To date, only 2 studies have been conducted in urban areas of Selangor (Ghani et al. 2019) and Kuala Lumpur (Rozita et al. 2006); however, the findings were inadequate due to lack of sample size. Therefore, this study with a relatively higher sample size focused on exploring the association of sociodemographic status towards knowledge and prevention practices for dengue.

The data in the study were collected from May to July 2019 in selected community areas located in Petaling Jaya of Selangor, Malaysia. The sample size was calculated based on the number of participants stated in a previous study by Ghani et al. (2019). With a 20% refusal rate (Rozita et al. 2006), a total of 550 participants initially approached, resulted in the real sample size of 441 individuals (= 80.2%). During the visit to each household, only the head of the household was interviewed. If the head of household was unavailable, other eligible family members were randomly selected provided they followed some inclusion criteria such as age (>18 years old), local resident, and able to understand the questions asked by the interviewer. All interviewers that participated in this study were trained by the experts for 2 wk before the interview session started.

The questionnaire used in this study was the improved version of the questionnaire used in previous research (Chandren et al. 2015). Knowledge related to dengue section consists of 6 parts: 1) dengue and *Ae. aegypti* and *Ae albopictus* characteristic; 2) transmission; 3) signs and symptoms of dengue hemorrhagic fever; 4) signs and symptoms of dengue; 5) prevention practices for dengue; and 6) treatment, cure, and precautionary measures for dengue. The scale for the measurement of knowledge section consisted of 44 items. For each statement, participants could choose between 3 response categories: "yes," "no," and "don't know." For the analyses, participants were scored as 1 for a correct response and 0 for an incorrect or "don't know" response. Several negatively worded items were reversed and recoded during the data analysis process. Possible scores ranged from 0 to

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44. Higher scores indicated greater knowledge about dengue.

Meanwhile, the self-reported practices of dengue preventive measures section consisted of 2 parts: 1) preventive measures reducing mosquito breeding habitats; and 2) preventive measures reducing mosquito bites were assessed, using items 9 and 5, respectively. A penalty point was assigned for each option, as 0 for "not at all" and "not applicable," 1 for "rarely," 2 for "sometimes," and 3 for "often" responses. The questionnaire was written in bilingual language (i.e., English and Malay language). The medium of the interview was in Bahasa Malaysia, the national language. Before the questionnaire was released to the participants, both the validity and reliability of the questionnaire were checked by the experts. A preliminary study among 20 public participants was carried out to ensure that the questionnaire carried effective, efficient, reliable, and valid data.

Data obtained in the study were analyzed using the Statistical Package for the Social Sciences (SPSS) program for Windows version 20.0 (SPSS, Chicago, IL). The univariate analysis of chi-square test was performed to determine the significant association between the independent variable (sociodemographic characteristics) and dependent variables (high and low scores of knowledge and self-reported dengue prevention practices). All significant values (2-tailed P-value < 0.05) in the univariate analyses were entered into the multivariate logistic regression analysis. Odds ratio (OR), 95% confidence intervals (95% CI), and P-values were calculated for each independent variable.

Overall, majority of participants had good knowledge, including general information of dengue and its vectors, transmission, signs and symptoms, prevention practices, and curability of the disease (Table 1). The results in Table 2 showed that more than half of the participants over 40 years old (57.1%) had a total knowledge score range of 32–44, compared with 39.5% in the 25–39 years age group and only 18.8% in the 18–24 years age group. More than 100 of the participants who worked as professional and managerial (53.5%) and most of the students (81.2%) had a total knowledge score range of 7–31. Our findings showed that less than half of the participants who had a tertiary education attainment (44.7%) had a total knowledge score of 32–44, while more than half of the participants who had a secondary and below education (63.1%) had a lower total knowledge score of 7–31. Participants whose average monthly household income was more than MYR3,000 (US$750.00) (51.6%) had a total knowledge score of 32–44, compared with participants whose average monthly household income was below MYR3,000 (33.2%). Results obtained from multivariate logistic regression showed that the participants over 40 years old were more likely (OR = 4.210, 95% CI = 1.652–10.733, $P = 0.003$) to have better dengue knowledge compared to the 18–24 years age group.

Meanwhile, there was a significant difference between dengue prevention practices and age of the participants ($P < 0.05$). Over half of both the 25–39 years age group (58.5%) and >40 years age group (57.1%) scored high, between 26 and 42, while only 40.6% of the 18–24 years age group scored in that range. Similarly, there was also a significant difference between the dengue prevention practices and average monthly household income ($P < 0.05$). The participants (61.5%) whose average monthly household income was more than MYR3,000 (61.5%) had a higher percentage of total dengue prevention practices score of 26–42 compared with those whose average monthly household income was below MYR3,000 (47.3%). Further analysis of multivariate logistic regression test indicated that participants whose average monthly household income was more than MYR3,000 were more likely (OR = 1.607, 95% CI = 1.059–2.438, $P = 0.026$) to perform more practices of dengue prevention compared with participants whose average monthly household income was below MYR3,000 (Table 2). The results regarding the practice of preventive measures for reducing mosquito breeding habitats and mosquito bites revealed that more than half of the participants often (>4 times) treated their stored water (18.1%) and checked for mosquito larvae inside and outside the house (28.8%).

In agreement with studies reported in the Philippines (Yboa and Labrague 2013), Cambodia (Kumaran et al. 2018), and Thailand (Swaddiwudhipong et al. 1992), the results of this investigation demonstrated that a majority of the participants were knowledgeable about the concept of dengue, the morphological characteristics of *Ae. aegypti* and *Ae. albopictus*, and the suitable habitats of these mosquitoes. Good knowledge of the mosquito vectors and signs and symptoms of dengue are important in identifying the disease and in seeking early and appropriate medical treatment to save lives (Ibrahim et al. 2009). Also interesting were the significant associations between prevention practices and average monthly household income. The results of logistic regression analysis found a significant association between the participants who earned a higher average monthly household income (>MYR3,000) and self-practices of dengue prevention compared with the participants who earned less. This could be due to the financial stability factors that allowed them to afford facilities or tools that aid in performing more practices of prevention measures such as hiring a professional or private pest control or installing screen windows in their house. In addition, the results of the study suggest that there was no significant association between knowledge of dengue and prevention practices, which is in agreement with similar studies (Hairi et al. 2003, Yboa and Labrague 2013). Both studies concluded that knowledge alone is not necessarily a predictor of good practices. The

Table 1. Results of knowledge of dengue and *Aedes aegypti* and *Ae. albopictus* characteristics, transmission, signs, and symptoms of dengue fever and dengue hemorrhagic fever, and prevention practices, treatment, curability, and precautionary measures for dengue.

Statement	No. (%)
Knowledge of dengue and *Ae. aegypti* and *Ae. albopictus* characteristics	
Dengue is a mosquito-borne disease	438 (98.6)
Dengue virus is transmitted by *Ae. aegypti* and *Ae. albopictus*	423 (95.9)
Dengue hemorrhagic fever can be fatal	401 (90.9)
Ae. aegypti and *Ae. albopictus* have black and white stripes on its leg and body	399 (90.5)
Dengue fever may become dengue hemorrhagic fever	374 (84.8)
Ae. aegypti and *Ae. albopictus* prefer to breed in a clean and stagnant water	361 (81.9)
Ae. aegypti and *Ae. albopictus* bite mainly during dusk and dawn	322 (73.0)
Dengue is caused by virus infection	317 (71.9)
Ae. aegypti prefers to live in shaded areas	228 (51.7)
Only females bite humans	189 (42.9)
Ae. albopictus prefers to live in any type of vegetation	163 (37.0)
Two species of *Aedes*: *Ae. aegypti* and *Ae. albopictus*	146 (33.1)
Males feed only on fruit or plant nectar	124 (28.1)
Knowledge of transmission of dengue	
Dengue usually appears 4–7 days after being bitten	323 (73.2)
Transmission from an infected person by touch	318 (72.1)
Transmission from an infected person by air	315 (71.4)
A person who had dengue cannot be reinfected	292 (66.2)
Transmission from an infected person by bodily fluids	265 (60.1)
Transmission from an infected person by blood	254 (57.6)
Ae. aegypti and *Ae. albopictus* biting dengue-infected person can spread it to others	245 (55.6)
Dengue epidemic occurs only during dry season	239 (54.2)
Dengue epidemic occurs only during rainy season	219 (49.7)
Ae. aegypti and *Ae. albopictus* eggs can contain dengue virus	201 (45.6)
Knowledge of signs and symptoms of dengue hemorrhagic fever	
Small red or purple spots under the skin	352 (79.8)
Dizziness or fainting	309 (70.1)
Bleeding in gums	223 (50.6)
Bleeding in the nose	216 (49.0)
Shortness of breath	182 (41.3)
Blood in stool	136 (30.8)
Blood in urine	122 (27.7)
Knowledge of signs and symptoms of dengue fever	
Headache	390 (88.4)
Chills	379 (85.9)
High fever for 5–7 days	378 (85.7)
Joint and muscle pain	370 (83.9)
Rash	358 (81.2)
Nausea and vomiting	332 (75.3)
Pain in the eyes	276 (62.6)
Knowledge of prevention practices for dengue	
Periodically emptying or drying out containers that retain water	420 (95.2)
Proper disposal of items that retain water	416 (94.3)
A weekly change of stored water	416 (94.3)
Covering water containers	407 (92.3)
Larvicide treatment in water containers	407 (92.3)
Knowledge of treatment, curability, precautionary measures for dengue	
Only immediate treatment can prevent complications and death	328 (74.4)
No medication for treating dengue	216 (49.0)

insignificant association between knowledge and dengue prevention practices found in the present study suggested that the support from government or private organization is needed as it could facilitate in initiating, designing, and implementing massive education programs or other services for a better dengue management throughout Malaysia.

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Table 2. Univariate and multivariate logistic analyses between sociodemographic status and knowledge, and prevention practices scores among the participants.[1]

Sociodemographic status	Frequency, no. (%)	Knowledge, no. (%)		Univariate (*P*)	Multivariate logistic regression for total knowledge score, OR (95% CI)	Prevention practices, no. (%)		Univariate (*P*)	Multivariate logistic regression for total knowledge score, OR (95% CI)
		Low scores (7–31)	High scores (32–44)			Low scores (0–25)	High scores (26–42)		
Gender									
Male	222 (50.3)	135 (60.8)	87 (39.2)	0.178		102 (45.9)	120 (54.1)	0.876	
Female	219 (49.7)	119 (54.3)	100 (45.7)			99 (45.2)	120 (54.8)		
Age[2] (years)									
18–24	64 (15.3)	52 (81.2)	12 (18.8)	$P < 0.001$	Reference	38 (59.4)	26 (40.6)	0.037	Reference
25–39	200 (47.8)	121 (60.5)	79 (39.5)		1.980 (0.826–4.747)	83 (41.5)	117 (58.5)		0.659 (0.350–1.240)
>40	154 (36.8)	66 (42.9)	88 (57.1)		4.210 (1.652–10.733)*	66 (42.9)	88 (57.1)		1.107 (0.720–1.703)
Race									
Malay	212 (48.1)	124 (58.5)	88 (41.5)	0.153		87 (41.0)	125 (59.0)	0.251	
Chinese	176 (39.9)	94 (53.4)	82 (46.6)			90 (51.1)	86 (48.9)		
Indian	43 (9.8)	31 (72.1)	12 (27.9)			20 (46.5)	23 (53.5)		
Others	10 (2.3)	5 (50.0)	5 (50.0)			4 (40.0)	6 (60.0)		
Occupation									
Professional and managerial	213 (48.3)	114 (53.5)	99 (46.5)	0.005	Reference	87 (40.8)	126 (59.2)	0.169	
Manual worker	96 (21.8)	64 (66.7)	32 (33.3)		0.752 (0.433–1.307)	45 (46.9)	51 (53.1)		
Student	32 (7.3)	26 (81.2)	6 (18.8)		0.655 (0.186–2.312)	19 (59.4)	13 (40.6)		
Housewife	25 (5.7)	15 (60.0)	10 (40.0)		0.671 (0.264–1.707)	10 (40.0)	15 (60.0)		
Retired	51 (11.6)	22 (43.1)	29 (56.9)		0.846 (0.402–1.779)	25 (49.0)	26 (51.0)		
Others	24 (5.4)	13 (54.2)	11 (45.8)		0.957 (0.380–2.410)	15 (62.9)	9 (37.5)		
Highest educational attainment									
Tertiary	311 (70.5)	172 (55.3)	139 (44.7)	0.140		135 (43.4)	176 (56.6)	0.157	
Secondary and below	130 (29.5)	82 (63.1)	48 (36.9)			66 (50.8)	64 (49.2)		
Average household income									
<MYR3,000	220 (49.9)	147 (66.8)	73 (33.2)	$P < 0.0001$	Reference	116 (52.7)	104 (47.3)	0.003	Reference
>MYR3,000	221 (50.1)	107 (48.4)	114 (51.6)		1.475 (0.944–2.306)	85 (38.5)	136 (61.5)		1.607 (1.059–2.438)*
Have you ever had dengue fever?									
Yes						43 (49.4)	44 (50.6)	0.421	
No						158 (44.6)	196 (55.4)		
Total knowledge score									
Low knowledge score						121 (47.6)	133 (52.4)	0.311	
High knowledge score						80 (42.8)	107 (57.2)		

[1] OR, odds ratio.
[2] There were 23 participants who refused to answer this question.
* Association is significant at the 0.05 level.

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