KAP STUDY

Revisiting dengue-related knowledge, attitudes and practices: A cross-sectional study in Ho Chi Minh City, Vietnam, 2018

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Abstract

Objective: In recent years, Vietnam has been recorded as one of the most endemic areas of dengue fever (DF). Thus, controlling DF has become a matter of concern to healthcare professionals and the government. Nevertheless, there has been little research exploring inhabitants' awareness about DF in Ho Chi Minh City, Vietnam. The aims of the study was to assess the knowledge, attitudes, and practices (KAP) regarding DF by the population in Ho Chi Minh City, Vietnam.

Methods: In July 2018, a cross-sectional study was conducted among 1,175 people in Ho Chi Minh City, Vietnam, using an administered questionnaire.

Results: Only 38% of participants had good knowledge, and 55% of the population reached the satisfactory practices score, while 74% showed positive attitudes relating to DF. Unlike many other studies, education level was not associated with KAP score. However, marital status and monthly income seemed to be related to participants' knowledge levels. In addition, the main sources of information in this research were television and the Internet.

Conclusion: This study showed that participants lacked knowledge regarding DF and practices to prevent it. These results recommend improving the population's knowledge and practices through campaigns aimed at preventing breeding of mosquitoes.

Keywords: Attitude, Dengue fever, Knowledge, Ho Chi Minh City, Practice, Vietnam. (JPMA 69: S-108 (Suppl. 2); 2019)

Introduction

Dengue fever (DF) is a mosquito-borne, viral infection — a major cause of morbidity and mortality that has reached hyperendemic proportions in the tropics and subtropics.[1] Four DENV serotypes (DENV 1-4) of female Aedes mosquitoes were transmitted to humans by the bites, mainly *Aedes aegypti* and *Aedes albopictus*.[2] Although infection with DENV may be asymptomatic,[3,4] it may also lead to a wide spectrum of diseases specialty was Dengue Shock Syndrome (DSS) which was the most severe condition.[5] The disease may cause some basic symptoms such as fever, headache, abdominal pains, rash, muscle aches, and bone pain. DF increases the risk of gastrointestinal bleeding, hypovolaemia, and, death,[2] especially, children included of a high risk of mortality were because of complications and lack of access to care.

The first confirmed epidemic of DF was recognized in the 1950s in the Philippines and Thailand.[6] In the past five decades, the incidence of DF worldwide has increased up to thirty-fold.[7,8] According to a recent study estimated 390 million got infections per year worldwide, with 96 million new apparent infections and 294 million inapparent infections.[3] The disease has now become endemic in more than 125 countries.[3,9] Growth of urbanization, overpopulation, international travel, and inadequate control measures-causing DF to expand to neighboring countries and more rural areas-are some of the main reasons for the increasing DF rate.[5,8,9] Approximately 3.9 billion people around the world live in dengue endemic countries and are at risk of contracting DF, and 1.3 billion people live in ten countries under the World Health Organization Regional Office for South-East Asia (SEARO), all of which are dengue endemic areas.[9] According to the World Health Organization (WHO), in 2017, 2,689 dengue cases in Singapore, 3,195 suspected dengue cases in Cambodia, and 11,039 cases of dengue with 14 deaths in Laos, were reported.[10]

In Vietnam, dengue is defined as a regular epidemic, indicating an exponentially increasing rate of incidence. From 2000 to 2009, dengue morbidity increased rapidly from 24,434 cases to 105,370 cases, followed by 69,680 more cases by 2011.[11] Furthermore, a recent report revealed that, in 2017, Vietnam recorded the highest number of cases, with 183,287 suspected dengue cases, including 32 deaths.[10]

In 2015, the tetravalent chimeric vaccine, CYD-TDV, entered the market despite its efficacy testing at only 60% (Dengue Vaccine Initiative, 2015). However, it still showed disappointing results in individuals under nine

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years of age.[12] There is currently no specific, licensed treatment available for dengue. Therefor, the large annual financial allocation for DF treatment and controlling dengue vectors has made dengue a huge matter of concern in Vietnam, enforcing a heavy burden on the national health budget. Vector control is the only means of dengue prevention. In this sense, it is crucial to acquire further knowledge and understand the implementation of preventive measures, as well as the Vietnamese population's attitudes toward such measures.

As a matter of concern, there are many studies about DF with different levels of knowledge, attitudes, and practices in different countries and areas in the world. A study conducted in Colombia showed a higher knowledge about dengue symptoms and transmission with 87.4% of correct answers.[13] However, only 8.3% of participants obtained satisfactory knowledge scores in Saudi Arabia.[14] Many similar studies have also been conducted in dengue endemic countries of the SEARO, including Singapore,[15] Laos PDR,[16] Cambodia,[17] Indonesia,[14] and the Philippines.[18] However, Vietnam lacks knowledge, attitudes, and practices (KAP) studies on DF,[19] particularly in recent years, which has led to an unclear reflection of the dengue status and prevented full evaluation of the government's dengue prevention policy.

People's awareness has increased by the policymaker were using the conventional and social media through awareness campaigns, DF KAP still remains unclear in Vietnam. In fact, over 85% of all dengue cases, and 90% of all deaths due to dengue, occur in the southern provinces of Vietnam.[11] The present study was designed and conducted in this context to evaluate people's KAP regarding DF among the population of Ho Chi Minh City, in southern Vietnam.

Material/Subjects/Patients and Methods

Study Design and Setting

This community-based, cross-sectional KAP study was conducted in Ho Chi Minh City, a large and populous city located in southern of Vietnam. Ho Chi Minh City is one of the quickest developing urban areas on the planet, with a decent rate of economic GDP/economic growth in recent years. With approximately 2,096 km^2 of surface area, Ho Chi Minh City had a total population of 8.992 million people in 2018, and its increases by approximately 0.232 million people each year.[20] The tropical climate in Ho Chi Minh City tends to be hot and humid, with a dry season and a rainy season, which is conducive to the development of mosquitoes and DF.

Sample Size Determination

To determine representative sample size, it was estimated that 50% of participants would have good KAP regarding dengue. The minimum recommended sample size was 385 which used a 5% margin of error and a 95% confidence level. This figure was based on the following formula.[21]

$$N = \frac{Z_{\alpha/2} \times P(1-P)}{d^2} = \frac{1.96 \times 0.5(1-0.5)}{0.05^2} = 385$$

The sample size was increased by 10% to allow for any missing or incomplete data that occurred during data collection. Consequently, the required sample size involved at least 423 participants.

Study Instrument

A structured, administered questionnaire was developed by the researchers after adapting studies assessing the levels of KAP regarding dengue in Nepal[22] and Indonesia.[14] The questionnaire was adjusted for wording, content, and culture after consulting expert opinions and related research published in English. The final draft of the questionnaire was translated into Vietnamese, and then re-translated into English, to ensure the first translation was accurate. Before the survey, the questionnaire was pre-tested by using the 50 participants in Ho Chi Minh City, who were not included in the results.

The questionnaire consisted of 55 questions, divided into four sections as follows: (1) socioeconomic information of participants (11 questions); (2) Knowledge regarding symptoms of dengue and prevention methods (19 questions); (3) attitude towards DF (13 questions); and (4) practices in dengue prevention (eight questions). The Cronbach's Alpha of 0.7 with each section was considered to reflect acceptable internal reliability.

Data Collection

Interviews took place in July 2018. Participants join in this research through the data collection form-face-to-face interviews-which were conducted by a data collection team that was provided with brief training prior to the study. People were free to participate in this study and the participants were given time to finish their questionnaires without being rushed. Participants who did not fully complete the questionnaire, and who did not live in Ho Chi Minh City, met the exclusion criteria.

Data Analysis

Data was entered using Microsoft (MS) Excel 2016 and analyzed via the Statistical Package for the Social Sciences (SPSS 20.0). To identify the predictors of poor

knowledge and practices, independent and dependent variables were converted into scores and categorized as poor and good. About questions relating to knowledge, scores of "one" and "zero" were given to the correct and incorrect knowledge. Relating to practices scores, people scored "one" for each action they did to prevent dengue fever and "zero" for each preventive action they did not take. Participants also receive one point for each correct answer in questions requiring them to select multiple correct answer choices. The attitude section comprised 13 questions in which participants were asked to respond to correct and incorrect statements via a five-point Likert-type scale-"Strongly disagree," "Disagree," "Not sure," "Agree," and "Strongly agree." Scores of "one" were awarded for "Agree" and "Strongly agree" when the question posed a correct statement and for "Disagree" and "Strongly disagree" when the question posed an incorrect statement. A score of "zero" was given to "Strongly disagree," "Disagree," and "Not sure" when the question posed a correct statement and for "Strongly agree," "Agree," and "Not sure" when the question posed an incorrect statement.[23] Scores for each question within a domain were added together to arrive at a single value out of a total score of 19, 13 and 8 for the three respective KAP domains. Respondents who scored 80% or more were considered to have good levels of KAP, while those who scored less were considered to have poor levels.

The analysis focused on the comparative description of the participants' responses. To investigate the role of socio-demographic characteristics on KAP, differences in socio-demographic status were compared with the KAP levels (good and poor) using the Chi Squared-Test, ANOVA, or Fisher's exact test, as appropriate. Logistic regression was also used to identify independent factors associated with good and poor KAP levels. Confounding factors were determined using the crude odds ratio (OR) in univariate analyses. The means or medians, standard deviations or quartile deviations, were presented as appropriate. For all statistical analyses, a level of significance equal to or less than 5% was considered as significant.

Ethical Consideration

The study protocol was approved by Department of Economic and Administrative Pharmacy, Pham Ngoc Thach University of Medicine. Participation was voluntary. Selected participants responded anonymously to the self-questionnaire, and no personal identifiers were included on the questionnaire.

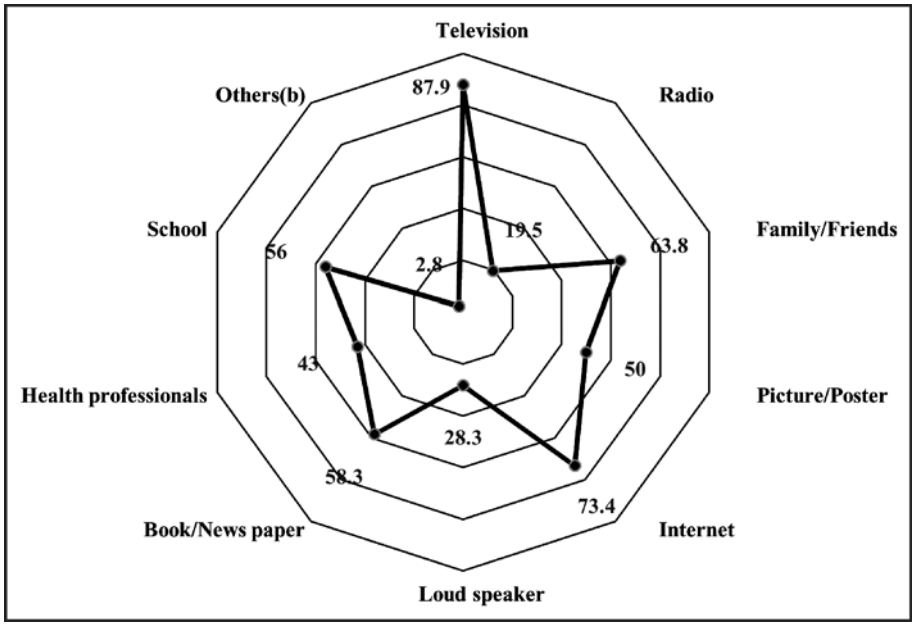
Results

Socio-economic characteristics of the study population in Ho Chi Minh City

A total of 1,175 respondents were recruited to participate in the survey — 423 (36%) males and 752 (64%) females. The majority of the respondents were between 18 and 23 years old (74.6%) and lived in urban areas (95.2%). Among the participants interviewed using the structured questionnaire, more than half of them were single, widowed, or divorced (72%). Most of participants were students (41.3%), and approximately 50% of the participants revealed that high school was their education level, while 37.2% had a university level education or higher. In addition, a clear majority of the participants had no personally experienced DF (71.7%), but more than half of them knew someone who had experienced dengue (64.1%) (Table-1).

Knowledge about Signs, Symptoms, and Transmission of DF

In relation to knowledge, female participants between



Others(b): Brochures, Mass meetings, Neighbors

Figure-1: Source of information on dengue fever among female.

Table-1: Socio-demographic characteristics of the participants in the survey (n,%).

Variable	Female		Male		Total	
	N=752	%	N=423	%	N=1,175	%
Age						
18 - <30	574	76.4	303	71.6	877	74.6
30 - <45	128	17.0	86	20.3	214	18.3
45 - <60	37	4.9	27	6.4	64	5.4
>60	13	1.7	7	1.7	20	1.7
Residence						
Urban	714	94.9	405	95.7	1119	95.2
Rural	38	5.1	18	4.3	56	4.8
Marital status						
Single/Widowed/Divorced	542	72.1	304	71.9	846	72.0
Married	210	27.9	119	28.1	329	28.0
Occupation						
Farmer/Worker	35	4.6	34	8.0	69	5.9
Civil servant/Officer	211	28.1	80	18.9	291	24.8
Housewife	111	14.8	34	8.0	145	12.3
Student	308	41.0	178	42.2	486	41.3
Others(a)	87	11.5	97	22.9	184	15.7
Education level						
Primary school or lower	5	0.7	5	1.2	10	0.8
Secondary school	17	2.3	12	2.8	29	2.5
High school	343	45.6	215	50.8	558	47.5
College	100	13.3	41	9.7	141	12.0
University or higher	287	38.1	150	35.5	437	37.2
Monthly income (USD)						
<215	301	40.0	163	38.5	464	39.5
215-<430	229	30.5	95	22.5	324	27.6
430-<650	82	10.9	54	12.8	136	11.6
?650	50	6.6	55	13.0	105	8.9
NA	90	12.0	56	13.2	146	12.4
Have you ever had dengue fever?						
Yes	197	26.2	135	31.9	332	28.3
No	555	73.8	288	68.1	843	71.7
Do you know someone who suffered dengue?						
Yes	482	64.1	271	64.1	753	64.1
No	270	35.9	152	35.9	422	35.9
Do you have a child/Children?						
Yes	161	21.4	83	19.6	244	20.8
No	591	78.6	340	80.4	931	79.2

Notes: Others(a): Chandler, Entrepreneur.
NA: No Answer.

30 and 45 years of age reached the highest score of knowledge (15.2 ± 2.5). When the participants who were married and those who were single/widowed/divorced were compared, the data revealed that single/widowed/divorced males tended to have better knowledge of DF than their married counterparts (14.6 ± 2.5, P=0.012). On the other hand, married females knew more about symptoms, signs, and transmission modes of DENV infection (14.9 ± 2.5, P=0.004) than single/widowed/divorced females (14.3 ± 2.5). In terms of monthly income, the amount of income tended to affect participants' knowledge, with the highest knowledge scores belonging to respondents who earned more than $650 USD per month (15.0 ± 2.2, P=0.002). In addition, people who knew someone who had suffered from dengue

Table-2: Relationships between socio-demographic profiles of participants and their scores for knowledge.

Variable	Male				Female			
	Mean ± SD	Median (Q1- Q3)	OR (95%CI)	P-value	Mean ± SD	Median (Q1- Q3)	OR (95%CI)	P-value
Age				0.229				0.015
18 - <30	14.6 ± 2.5	15.0 (13.0-16.0)	1.0		14.3 ± 2.5	15.0 (13.0-16.0)	1.0	
30 - <45	14.3 ± 2.6	14.0 (13.0-16.0)	0.3 (0.0-1.8)		15.2 ± 2.5	14.0 (13.0-16.0)	0.7 (0.2-2.0)	
45 - <60	13.7 ± 2.8	13.0 (11.5-15.5)	0.2 (0.0-1.6)		14.0 ± 2.2	13.0 (11.5-15.5)	1.2 (0.4-3.8)	
>60	14.6 ± 2.6	15.0 (14.5-16.0)	0.3 (0.0-1.9)		14.0 ± 2.3	15.0 (14.5-16.0)	0.5 (0.1-1.8)	
Residence				0.511				0.147
Urban	14.5 ± 2.5	15.0 (13.0-16.0)	1.0		14.5 ± 2.5	15.0 (13.0-16.0)	1.0	
Rural	14.8 ± 2.6	14.5 (13.0-17.0)	0.7 (0.3-1.9)		14.3 ± 2.8	14.5 (13.0-17.0)	1.7 (0.8-3.2)	
Marital status				0.012				0.004
Single/Widowed/Divorced	14.6 ± 2.5	15.0 (13.0-16.0)	1.0		14.3 ± 2.5	15.0 (13.0-16.0)	1.0	
Married	14.2 ± 2.6	14.0 (12.5-16.0)	1.1 (0.5-2.4)		14.9 ± 2.5	14.0 (12.5-16.0)	1.9 (1.0-3.4)	
Occupation				0.320				0.925
Farmer/Worker	14.3 ± 3.0	15.0 (11.3-16.0)	1.0		14.6 ± 2.7	15.0 (11.3-16.0)	1.0	
Civil servant/Officer	14.6 ± 2.3	15.0 (13.0-16.0)	3.0 (1.1-8.0)		14.5 ± 2.6	15.0 (13.0-16.0)	0.6 (0.5-0.9)	
Housewife	14.2 ± 2.1	14.0 (13.0-15.8)	1.4 (0.7-2.9)		14.4 ± 2.5	14.0 (13.0-15.8)	1.2 (0.7-2.1)	
Student	14.7 ± 2.4	15.0 (13.0-16.0)	1.0 (0.4-2.7)		14.8 ± 2.5	15.0 (13.0-16.0)	1.1 (0.6-1.9)	
Others(a)	14.1 ± 2.8	14.0 (12.0-16.0)	1.3 (0.6-3.0)		14.4 ± 2.4	14.0 (12.0-16.0)	1.2 (0.7-1.9)	
Education level				0.190				0.599
Primary school or lower	11.6 ± 2.4	11.0 (10.0-13.0)	1.0		14.4 ± 3.3	11.0 (10.0-13.0)	1.0	
Secondary school	13.3 ± 2.3	13.5 (11.5-15.0)	0.3 (0.1-1.6)		12.8 ± 2.8	13.5 (11.5-15.0)	0.9 (0.2-5.7)	
High school	14.6 ± 2.5	15.0 (13.0-16.0)	0.7 (0.3-1.5)		14.6 ± 2.3	15.0 (13.0-16.0)	0.4 (0.1-1.4)	
College	14.5 ± 2.4	15.0 (13.0-16.0)	0.6 (0.3-1.4)		14.2 ± 2.6	15.0 (13.0-16.0)	0.9 (0.6-1.2)	
University or higher	14.5 ± 2.6	14.5 (13.0-16.0)	1.4 (0.6-3.3)		14.7 ± 2.5	14.5 (13.0-16.0)	0.9 (0.5-1.4)	
Monthly income (USD)				0.012				0.014
1. <215	14.6 ± 2.5	15.0 (13.0-16.0)	1.0		14.7 ± 2.6	15.0 (13.0-16.0)	1.0	
2. 215-<430	14.4 ± 2.5	15.0 (13.0-16.0)	0.9 (0.6-1.5)		14.5 ± 2.5	15.0 (13.0-16.0)	1.4 (0.8-2.2)	
3. 430-<650	13.9 ± 2.7	14.0 (13.0-16.0)	0.3 (0.2-0.6)		14.0 ± 2.5	14.0 (13.0-16.0)	1.0 (0.6-1.7)	
4. ?650	14.9 ± 2.3	15.0 (14.0-16.5)	0.9 (0.5-1.8)		15.4 ± 2.0	15.0 (14.0-16.5)	0.7 (0.4-1.4)	
NA	14.5 ± 2.7	14.0 (13.0-17.0)	1.2 (0.7-2.3)		14.3 ± 2.5	14.0 (13.0-17.0)	2.1 (1.1-4.3)	
Have you ever had dengue fever?				0.135				0 .551
Yes	15.0 ± 2.6	15.0 (13.0-17.0)	1.0		14.6 ± 2.5	15.0 (13.0-17.0)	1.0	
No	14.3 ± 2.4	14.5 (13.0-16.0)	1.4 (0.9-2.0)		14.5 ± 2.5	14.5 (13.0-16.0)	0.9 (0.7-1.3)	
Do you know someone who suffered dengue?				0.105				0.065
Yes	14.6 ± 2.6	15.0 (13.0-17.0)	1.0		14.5 ± 2.5	15.0 (13.0-17.0)	1.0	
No	14.3 ± 2.3	15.0 (13.0-16.0)	1.4 (0.9-2.2)		14.5 ± 2.5	15.0 (13.0-16.0)	1.3 (0.9-1.8)	
Do you have a child/Children?				0.018				0.014
Yes	14.2 ± 2.4	14.0 (13.0-15.5)	1.0		14.9 ± 2.5	14.0 (13.0-15.5)	1.0	
No	14.6 ± 2.6	15.0 (13.0-16.0)	0.5 (0.3-0.9)		14.3 ± 2.5	15.0 (13.0-16.0)	0.6 (0.5-0.9)	

Note: SD: Standard Deviation; Q1: 25th percentile; Q3: 75th percentile; OR: Odds Ratio; 95% CI: Confidence interval 95%; *Significant difference.

exhibited better knowledge (14.6 ± 2.5, P=0.011) than the rest of the participants (Table-2).

Attitudes of the Respondents on Dengue

Table 3 shows the comparison of participants' attitude scores through criteria related to their general information. Overall, there was a slight difference between male participants who were married and those who were single/widowed/divorced (11.5 ± 1.4 and 11.4 ± 1.2, respectively, P= 0.001). However, no differences were observed between females who were married and those who were single/widowed/divorced.

Participants' Practices to Prevent and Control DF

Data about the levels of participants' practices were calculated and illustrated in Table-4. Age and marital

Table-3: Relationships between socio-demographic profiles of participants and their scores for attitudes.

Variable	Male				Female			
	Mean ± SD	Median (Q1- Q3)	OR (95%CI)	P-value	Mean ± SD	Median (Q1- Q3)	OR (95%CI)	P-value
Age				0.200				0.110
18 - <30	11.3 ± 1.3	11.0 (10.0-12.0)	1.0		11.4 ± 1.3	12.0 (11.0-12.0)	1.0	
30 - <45	11.5 ± 1.3	12.0 (11.0-13.0)	0.1 (0.0-1.3)		11.7 ± 1.3	12.0 (11.0-13.0)	2.1 (1.1-4.0)	
45 - <60	11.5 ± 1.4	12.0 (11.0-13.0)	0.2 (0.0-1.7)		11.6 ± 1.3	11.0 (11.0-13.0)	2.7 (1.0-7.0)	
>60	12.0 ± 1.5	13.0 (11.5-13.0)	0.3 (0.0-3.9)		11.8 ± 1.4	12.0 (12.0-12.3)	3.0 (0.6-15.3)	
Residence				0.064				0.528
Urban	11.4 ± 1.3	12.0 (11.0-13.0)	1.0		11.5 ± 1.3	12.0 (11.0-13.0)	1.0	
Rural	10.8 ± 1.4	11.0 (10.0-12.0)	2.4 (0.9-6.3)		11.5 ± 1.1	11.5 (10.8-12.0)	1.3 (0.6-3.0)	
Marital status				0.001*				0.803
Single/Widowed/Divorced	11.4 ± 1.2	11.0 (10.8-12.0)	1.0		11.5 ± 1.2	12.0 (11.0-12.0)	1.0	
Married	11.5 ± 1.4	12.0 (10.0-13.0)	2.1 (1.3-3..2)		11.5 ± 1.3	12.0 (11.0-13.0)	0.7 (0.3-1.3)	
Occupation				0.489				0.134
Farmer/Worker	11.9 ± 1.2	12.0 (11.0-13.0)	1.0		11.6 ± 1.5	12.0 (10.0-13.0)	1.0	
Civil servant/Officer	11.5 ± 1.3	12.0 (10.0-13.0)	2.4 (0.7-7.9)		11.6 ± 1.3	12.0 (11.0-13.0)	0.9 (0.4-2.3)	
Housewife	11.6 ± 1.4	12.0 (10.0-13.0)	0.8 (0.4-1.8)		11.3 ± 1.3	11.0 (10.0-12.0)	1.3 (0.7-2.4)	
Student	11.3 ± 1.3	11.0 (10.0-12.0)	1.1 (0.4-3.0)		11.5 ± 1.1	12.0 (11.0-12.0)	0.7 (0.4-1.3)	
Others(a)	11.4 ± 1.3	11.0 (11.0-13.0)	0.8 (0.3-2.0)		11.5 ± 1.3	12.0 (11.0-13.0)	0.8 (0.5-1.5)	
Education level				0.758				0.410
Primary school or lower	12.2 ± 1.3	13.0 (12.0-13.0)	1.0		12.6 ± 1.5	13.0 (12.0-13.0)	1.0	
Secondary school	11.3 ± 1.5	11.0 (10.0-13.0)	0.7 (0.1-8.3)		11.7 ± 1.5	12.5 (10.8-13.0)	0.9 (0.5-1.6)	
High school	11.3 ± 1.3	11.0 (11.0-12.0)	0.4 (0.1-1.8)		11.4 ± 1.2	11.0 (11.0-12.0)	0.9 (0.3-3.0)	
College	11.8 ± 1.2	12.0 (11.0-13.0)	1.1 (0.5-2.4)		11.5 ± 1.4	12.0 (10.0-13.0)	0.7 (0.5-1.1)	
University or higher	11.4 ± 1.3	12.0 (10.0-13.0)	1.2 (0.5-2.9)		11.5 ± 1.3	12.0 (11.0-13.0)	0.8 (0.5-1.3)	
Monthly income (USD)				0.997				0.965
1. <215	11.3 ± 1.2	11.0 (11.0-12.0)	1.0		11.5 ± 1.2	12.0 (11.0-12.0)	1.0	
2. 215-<430	11.5 ± 1.4	12.0 (10.0-13.0)	1.0 (0.5-2.4)		11.6 ± 1.3	12.0 (11.0-13.0)	1.1 (0.7-1.7)	
3. 430-<650	11.6 ± 1.3	12.0 (10.3-13.0)	0.9 (0.4-2.1)		11.4 ± 1.4	12.0 (10.0-13.0)	1.0 (0.5-1.7)	
4. ?650	11.3 ± 1.3	11.0 (10.0-12.0)	1.0 (0.4-2.6)		11.5 ± 1.2	12.0 (11.0-12.0)	0.8 (0.4-1.7)	
NA	11.4 ± 1.4	11.0 (10.8-13.0)	1.1 (0.4-2.8)		11.5 ± 1.3	12.0 (11.0-13.0)	1.0 (0.6-1.7)	
Have you ever had dengue fever?				0.170				0.572
Yes	11.5 ± 1.3	12.0 (11.0-13.0)	1.0		11.6 ± 1.3	12.0 (11.0-13.0)	1.0	
No	11.4 ± 1.3	11.0 (10.0-12.0)	1.4 (0.9-2.3)		11.5 ± 1.3	12.0 (11.0-13.0)	0.9 (0.6-1.3)	
Do you know some who suffered dengue?				0.174				0.550
Yes	11.4 ± 1.3	11.0 (11.0-13.0)	1.0		11.5 ± 1.3	12.0 (11.0-13.0)	1.0	
No	11.4 ± 1.3	11.5 (10.0-12.0)	1.4 (0.9-2.1)		11.5 ± 1.3	12.0 (11.0-13.0)	1.0 (0.5-2.1)	
Are you have a child/Children?				0.606				0.555
Yes	11.6 ± 1.3	12.0 (11.0-13.0)	1.0		11.6 ± 1.3	12.0 (11.0-13.0)	1.0	
No	11.4 ± 1.3	11.0 (10.0-12.0)	1.2 (0.7-2.0)		11.5 ± 1.3	12.0 (11.0-12.0)	1.1 (0.8-1.5)	

Note: SD: Standard Deviation; Q1: 25th percentile; Q3: 75th percentile; OR: Odds Ratio; 95% CI: Confidence interval 95%; *Significant difference.

status showed a significant difference in each compared group. People between the ages of 18 and 30 were identified as the group with the best practices (6.5 ± 1.6), followed by participants between 30 and 45 (6.1 ± 1.6). In terms of marital status, people who were single/widowed/divorced tended to have better practices (6.5 ± 1.6, P=0.000) than their counterparts (6.2 ± 1.7). When occupations were compared, students reached the highest score (6.5 ± 1.6) followed by civil servants/officers (6.4 ± 1.7). However, having personally experienced DF did not affect the participant's practices (Table-4).

Source of Information

Regarding the sources of information, both males and females revealed that they received their information mainly from television (82.3% for males and 87.9% for females). The Internet also played an important role in

Table-4: Relationships between socio-demographic profiles of participants and their scores for practices.

Variable	Male				Female			
	Mean ± SD	Median (Q1- Q3)	OR (95%CI)	P-value	Mean ± SD	Median (Q1- Q3)	OR (95%CI)	P-value
Age				0.001*				0.101
18 - <30	6.4 ± 1.7	7.0 (5.0-8.0)	1.0		6.5 ± 1.6	7.0 (5.0-8.0)	1.0	
30 - <45	6.0 ± 1.5	6.0 (5.0-7.0)	0.5 (0.3-0.8)		6.2 ± 1.7	7.0 (5.0-8.0)	0.8 (0.5-1.3)	
45 - <60	5.9 ± 1.8	6.0 (4.5-8.0)	0.4 (0.2-0.9)		6.1 ± 1.6	6.0 (5.0-8.0)	0.6 (0.3-1.2)	
>60	5.0 ± 1.7	5.0 (4.0-5.5)	0.1 (0.0-1.0)		6.2 ± 1.8	6.5 (4.8-8.0)	0.9 (0.3-2.9)	
Residence				0.454				0.808
Urban	6.3 ± 1.7	7.0 (5.0-8.0)	1.0		6.4 ± 1.6	7.0 (5.0-8.0)	1.0	
Rural	6.9 ± 1.3	7.5 (6.0-8.0)	1.4 (0.5-3.8)		6.5 ± 1.8	7.5 (5.0-8.0)	1 (0.5-2.0)	
Marital status				0.001*				0.040*
Single/Widowed/Divorced	6.4 ± 1.7	7.0 (5.0-8.0)	1.0		6.5 ± 1.6	7.0 (5.0-8.0)	1.0	
Married	6.0 ± 1.7	6.0 (5.0-8.0)	0.5 (0.2-0.9)		6.3 ± 1.6	6.5 (5.0-8.0)	0.7 (0.4-1.2)	
Occupation				0.043*				0.166
Farmer/Worker	6.5 ± 1.4	7.0 (6.0-8.0)	1.0		6.0 ± 1.8	6.0 (4.0-8.0)		
Civil servant/Officer	6.0 ± 1.7	6.0 (5.0-7.3)	1.6 (0.6-4.1)		6.6 ± 1.6	7.0 (5.0-8.0)	1.0 (0.5-2.5)	
Housewife	6.7 ± 1.5	7.0 (6.0-8.0)	1.0 (0.5-2.1)		6.3 ± 1.6	7.0 (5.0-8.0)	1.2 (0.7-2.1)	
Student	6.5 ± 1.7	7.0 (5.0-8.0)	3.5 (1.4-9.3)		6.6 ± 1.4	7.0 (6.0-8.0)	1.2 (0.7-2.2)	
Others(a)	6.0 ± 1.7	6.0 (5.0-8.0)	1.6 (0.7-3.6)		6.2 ± 1.7	6.0 (5.0-8.0)	2.0 (0.9-4.2)	
Education level				0.310				0.212
Primary school or lower	5.8 ± 1.5	6.0 (5.0-6.0)	1.0		5.8 ± 2.3	6.0 (4.0-8.0)	1.0	
Secondary school	5.9 ± 1.7	6.0 (5.0-7.0)	0.5 (0.0-5.6)		5.6 ± 1.6	5.5 (4.8-7.0)	0.5 (0.1-3.5)	
High school	6.4 ± 1.7	7.0 (5.0-8.0)	1.3 (0.3-5.6)		6.3 ± 1.6	7.0 (5.0-8.0)	0.6 (0.2-2.0)	
College	6.5 ± 1.6	7.0 (6.0-8.0)	0.8 (0.4-1.6)		6.3 ± 1.7	6.0 (5.0-8.0)	0.5 (0.3-1.1)	
University or higher	6.1 ± 1.7	6.0 (5.0-8.0)	2.3 (1.0-5.3)		6.6 ± 1.6	7.0 (5.0-8.0)	0.7 (0.4-1.2)	
Monthly income (USD)				0.036*				0.242
1. <215	6.3 ± 1.7	7.0 (5.0-8.0)	1.0		6.6 ± 1.5	7.0 (6.0-8.0)	1.0	
2. 215-<430	6.3 ± 1.7	7.0 (5.0-8.0)	1.2 (0.7-2.1)		6.2 ± 1.7	7.0 (5.0-8.0)	0.8 (0.6-1.2)	
3. 430-<650	5.7 ± 1.7	6.0 (4.0-7.0)	0.5 (0.2-1.0)		6.6 ± 1.5	7.0 (6.0-8.0)	1.3 (0.8-2.3)	
4. ?650	6.4 ± 1.5	7.0 (5.0-8.0)	1.4 (0.7-2.8)		6.7 ± 1.7	8.0 (5.0-8.0)	1.3 (0.7-2.6)	
NA	6.5 ± 1.6	7.0 (6.0-8.0)	1.5 (0.8-2.9)		6.3 ± 1.7	7.0 (5.0-8.0)	0.9 (0.5-1.4)	
Have you ever had dengue fever?				0.135				0.535
Yes	6.5 ± 1.6	7.0 (5.0-8.0)	1.0		6.6 ± 1.4	7.0 (6.0-8.0)	1.0	
No	6.2 ± 1.7	6.5 (5.0-8.0)	1.3 (0.8-2.0)		6.4 ± 1.7	7.0 (5.0-8.0)	1.1 (0.8-1.5)	
Do you know some who suffered dengue?				0.574				0.230
Yes	6.3 ± 1.7	7.0 (5.0-8.0)	1.0		6.3 ± 1.6	7.0 (5.0-8.0)	1.0	
No	6.2 ± 1.7	7.0 (5.0-8.0)	1.1 (0.7-1.7)		6.6 ± 1.6	7.0 (5.0-8.0)	1.4 (0.7-2.6)	
Are you have a child/Children?				0.036*				0.272
Yes	6.1 ± 1.6	6.0 (5.0-8.0)	1.0		6.3 ± 1.7	7.0 (5.0-8.0)	1.0	
No	6.3 ± 1.7	7.0 (5.0-8.0)	1.1 (0.5-2.3)		6.5 ± 1.6	7.0 (5.0-8.0)	0.8 (0.6-1.1)	

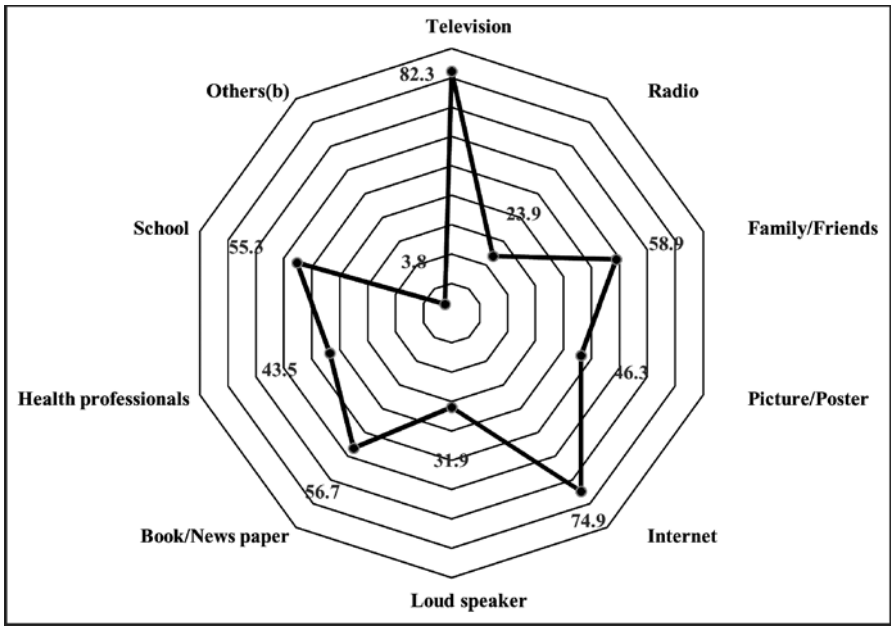
Note: SD: Standard Deviation; Q1: 25th percentile; Q3: 75th percentile; OR: Odds Ratio; 95% CI: Confidence interval 95%; *Significant difference.

providing information to survey participants (74.9% for males and 75.4% for females). Regarding sources of information from people, family/friends were identified as the most frequent source (58.9% for males and 63.8% for females), even more than health professionals (43.5% for males and 43% for females). In addition, books/newspapers and pictures/posters still play a certain role in granting information, especially for females, but not much information was obtained from the radio (23.9% for males and 19.5% for females) (Figure 1, Figure 2).

Discussion

Knowledge on symptoms, signs, and transmission of DF in comparison with other studies

This community-based study was conducted to evaluate



Others(b): Brochures, Mass meetings, Neighbors

Figure-2: Source of information on dengue fever among male.

the KAP related to DF and DENV infection among citizens in Ho Chi Minh City, which is one of the most endemic areas of DF in Vietnam.

In the results of this study, more than 50% of the participants had poor knowledge regarding DF, and only 38.2% of respondents reached a sufficient knowledge level. The percentage of poor knowledge scores in this study was slightly higher than that of the study from Pakistan, which was conducted among adults of high and low socioeconomic groups and found that only 35% of the study sample had adequate knowledge about DF and its vectors.[24] Another survey among high school students in Makkah, Saudi Arabia, also revealed that more than 50% of respondents had poor knowledge.[25]

Although, most of participants in this study knew about the major symptoms of DENV, such as fever, a minority of participants knew that joint pain and muscle pain were symptoms of DF, and only 13% of participants knew that bone soreness is a serious DF symptom. A study was conducted in Westmoreland, Jamaica, have confirmed this finding. This study revealed that participants' awareness was deficient, with less than 50% of participants having correct answers about dengue symptoms, although fever was still the most recognized symptom.[26]

Assessing the association between specific demographic factors and knowledge led to particular trends. Specifically, females showed a slightly better knowledge than their male counterparts (38.8% and 37.1%, respectively). In terms of marital status, married females were interestingly determined to have substantially better knowledge. The reason could be that females tend to be mature and spend more time on finding useful information related to protecting family health. However, in contrast, another study in Ache, Indonesia, researched the relationship between marital status and knowledge levels but did not obtain statistically significant results (Harapan et al., 2018).

Our study demonstrated a strongly affiliation between monthly income and participants' knowledge; people who had monthly incomes of more than $650 USD showed higher knowledge scores compared the remaining groups, for both sexes. Interestingly, females always showed better knowledge levels when compared to males who had the same monthly income. The level of DF knowledge reported in this study seemed to be higher if the participant knew someone who had suffered from DF. This result was also found in a similar study in Saudi Arabia, in which having heard about DF was the strongest predictor for having a high knowledge score.[25]

Attitude Level of Participants toward Dengue Fever in Comparison with Other Studies

Overall, respondents in this study reached satisfactory attitude scores, with 93% of participants believing that DF is a serious illness and 94% knowing that controlling the breeding places of mosquitoes was a good strategy to prevent DF. Nearly 100% of participants knew that stagnant water around houses-in discarded tires, broken pots, and bottles-were breeding places of *Aedes*, exposing everyone in the vicinity to the possibility of contracting DF. The same results were also illustrated by research in Malaysia, in which the university community had good attitudes, with the median total score corresponding to over 75% of the maximum possible attitudinal score.[27] Another survey in Yemen showed positive attitudes of respondent household heads towards DF, with 97.7% of respondents agreeing about the seriousness of DF.[28]

However, these results can be distinguished from the abovementioned Indonesian study,[14] in which knowledge (which was revealed to be low) had a strong correlation to participants' attitudes.

Preventive Practices against DF

Generally, the practices in this investigation reached the satisfactory level with 55% of respondents. 84% of participants used mosquito repellent/cream and mosquito coils to reduce mosquitoes, and the least popular way of reducing mosquitoes was chasing them. Similarly, a study in the Philippines revealed that 70.9% of participants used mosquito coils, in addition to other methods, such as fans and bed nets.[24] In addition, more than 85% of this study's respondents knew that cutting down bushes in the yard and cleaning up garbage/trash were effective ways to reduce mosquitoes. There was also a strong relationship between marital status and the participants' attitude scores. Surprisingly, the data demonstrated that people in both sexes who were single/widowed/divorced tended to have higher practices scores. In terms of occupation, students had the highest mean attitudes score, and farmers/workers showed a slightly lower attitude toward preventing DF. Research in Cambodia also concluded similar results-that working as a farmer was associated with low preventive practices (Syed et al., 2010). This can be explained by the requirements of the occupation and lessened opportunities for farmers to contact sources of information.

Main Source of Information

As predicted, we observed a higher use of the television as a source of DF information among both male and female participants, followed by the Internet as the second most popular source of information. The same results were also achieved in many countries, such as Jamaica,[26] Laos,[16] and Nepal.[22] This indicates that awareness of DF could be raised via television and the Internet during and/or after a DF episode. Nevertheless, this distinguishes our results from another study conducted in 2016 in Saudi Arabia, which found that the main sources of information for both sexes were street advertisements, followed by primary healthcare providers for boys (12.7%) and television for girls (10.6%).[25] As a matter of concern, governments should invest more in propaganda campaigns via television and Internet mass media to improve the KAP of citizens in Ho Chi Minh City.

Conclusion

In the largest city of Vietnam, inhabitants' attitudes met a satisfactory level. However, there is still a challenging lack of knowledge and safe practices regarding dengue in the community. Most importantly, DF prevention and control should be promoted, not only for students, but also for farmers and workers, who do not spend much time approaching sources of information. Moreover, the government should organize further campaigns to prevent mosquitoes in the community. Better information is required to help guide the implementation of dengue prevention programs in the government's effort to engage with the community, especially through mass media, such as television and the Internet. For farmers and workers, who do not spend much time approaching sources of information, government should perform periodic propaganda campaigns related to DF and guide practice preventing measures against DF at residential area.

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