



Awareness and practice related to dengue infection among military cadets in Malaysia

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ABSTRACT

Background: Dengue is among the world's most emerging infections. The human behavior is largely overlooked to consider knowledge, attitude, and practice that could allow this infection to have a devastating impact on health. There is a lack of evidence on health behavior regarding dengue among military cadets, who will serve as role models and carriers of knowledge for the armed forces. **Aim:** The study was conducted to explore the awareness and preventive practice regarding dengue among military cadets in Malaysia. **Methods:** A cross-sectional study was conducted in the National Defence University of Malaysia. Responses of self-administered structured questionnaire covering aspects of knowledge, attitude, and practices toward the dengue were obtained from 183 military cadets during health screening campaign. **Results:** Most of the respondents answered that a person with dengue may develop typical symptoms such as fever for 3-5 days (174, 95.1%), headache (169, 92.3%), joint pain (168, 91.8%), muscle pain (133, 72.7%), and rashes (138, 75.4%). The vast majority knew that dengue is transmitted by *Aedes* mosquito bites (179, 97.8%), mosquitos breed in clean stagnant water (155, 84.7%), and preventive measures include covering water containers (180, 98.4%), and cleaning garbage (173, 94.5%). Almost all perceived dengue as one of the most serious health problems (178, 97%) and felt that it requires prevention (168, 91.8%). About one-third always practiced wearing protective clothes (65, 35.5%), cut trees/vegetation around the house (65, 35.5%), used mosquito coils/liquids/vaporizers (62, 33.9%), electric fan (59, 32.2%), and mosquito bed net (50, 27.2%). A little portion always used insecticide spray (44, 24.0%), and window/doors screen (42, 23.0%). **Conclusion:** Better knowledge does not necessarily lead to better practice of dengue preventive measures. More emphasis must be given to educational campaigns for mosquito control practice among military cadets.

KEY WORDS: Attitude, dengue infection, knowledge, military cadets, preventive practice

INTRODUCTION

Dengue is a viral, mosquito-borne disease of the tropical and subtropical world, which has shown a dramatic increase in incidence in the recent decades [1]. Dengue has a significant burden on the armed forces and can be responsible for the incapacitation of a large number of troops. During the dengue epidemic the attack rates were reported to be more than 80%, which severely affected soldiers' health and readiness for combat [2].

The symptoms of dengue include fever, nausea, rashes, aches, and pains. Currently, there is no vaccine against dengue virus and the only mean to prevent disease is through vector control of the *Aedes* mosquito and personal protection measures [3]. Knowledge regarding *Aedes* mosquito breeding sites and larval habitats is vital for effective vector control that uses various methods including spraying of breeding sites with insecticide

and removal of the breeding sites [4]. Personal protection against mosquito bites usually include protective clothing, use of repellents, and sleeping under insecticide-treated bed nets [5].

It has been shown that vector control and dengue prevention programs are the most effective when people actively participate in their development and implementation [3]. Thus, enhancing the health behavior of military personnel with regard to dengue will bring about a reduction in the impact of this disease on military forces. In addition, knowledge on dengue signs and symptoms is important to ensure that individuals seek prompt treatment timely. There is a lack of evidence on health behavior regarding dengue among military cadets, who will serve as role models and carriers of knowledge about dengue for the armed forces. This study was conducted to explore knowledge, attitude, and practice regarding dengue among military cadets of the National Defence University of Malaysia (NDUM).

METHODS

Study Design and Data Collection Procedure

A descriptive cross-sectional study was conducted among military cadets from the NDUM. The data were collected over a period of 5 months from December, 2013 to May, 2014, and analyzed in June, 2014. Convenience sampling was used to draw the sample for this study. A total of 224 military cadets, visiting the NDUM health center during the screening campaign, were provided the opportunity to participate in the study. The investigators used the structured, pre-tested questionnaire both in Malay and English, which was developed from the literature [6-8]. The questionnaire consisted of five parts. The first part included questions regarding demographic data, such as gender, age and academic year, and previous experience with dengue. The second part included 50 questions on awareness about dengue and knowledge of dengue symptoms, routes of transmission, common *Aedes* mosquito breeding sites, as well as vector control, and personal protection measures. The response options included “yes” or “no,” and “true” or “false.” The third part included two questions on severity of illness and needs for preventive actions, which assessed attitudes toward dengue. The response options included “yes” or “no,” and “agree” or “disagree.” The fourth part addressed practices of dengue prevention and included 13 questions, such as the use of insecticide spray, mosquito repellents, and wearing protective clothes. The scale of 0-4 points was used for the response: 0 = never, 1 = seldom, 2 = sometimes, 3 = usually, 4 = always. The fifth part included questions on sources of information about dengue. The questionnaires were handed out at the site personally and collected on the spot once the participants have completed them individually and anonymously.

Statistical Analysis

All the variables were coded, labeled, and analyzed descriptively using the Statistical Package for Social Sciences, version 21. Frequencies and percentages were used for analyzing demographic data and responses related to knowledge, attitude, and practices toward dengue.

Ethical Considerations

The proposal for the study was approved by the Ethics Committee (Department of Community Medicine, NDUM). The respondents were recruited after they had given informed consent. A detailed explanation on the objectives of the study was given.

RESULTS

The response rate for this study was 81.7%. Out of a total of 224 cadets who were invited to participate in the study, 183 were recruited to participate in the study. Among those who refused to take part in this study, the main reason was reluctance to be interviewed. Table 1 describes the socio-demographic details of the study population. Majority of the respondents were

foundation, year 1, and year 2 cadets (96.8%). Year 3, 4, and 5 cadets were out of campus most of the time during the study, conducting the field exercise. 22 out of 183 (12%) reported that they previously had dengue.

Knowledge Toward Dengue Infection

Most of the respondents answered that a person with dengue may develop typical symptoms like fever for 3-5 days (95.1%), headache (92.3%), joint pain (91.8%), muscle pain (72.7%), and rashes (75.4%). Large proportion believed that antipyretics and antibiotics are medicines against dengue (77% and 79.2%, respectively) [Table 2].

The majority of the cadets knew that dengue is caused by a virus (85.5%) and transmitted by *Aedes* mosquito bite (97.8%). Most of them knew that the mosquito usually bites either at sunset (92.3%) or at sunrise (68.9%). More than half (61.2%) thought that it is likely to catch dengue outside Malaysia. Large proportion believed that dengue may be transmitted by blood transfusion (57.9%) while 21.9% claimed that it can be transmitted through sexual intercourse [Table 3].

Table 1: Socio-demographic characteristics and history of dengue of respondents (*n* = 183)

Variables	<i>n</i>	%
Gender		
Male	119	65.0
Female	64	34.0
Progress in studies		
Pre-university (foundation)	70	38.3
Year 1	41	22.4
Year 2	66	36.1
Year 3	5	2.7
Year 4	0	0
Year 5	1	0.5
Faculty		
Foundation	70	38.3
Medicine and defence health	56	30.6
Defence science and technology	13	7.1
Engineering	25	13.7
Defence strategy and management	19	10.4
Previous experience of dengue (yes)	22	12.0

Table 2: Responses on knowledge of dengue symptoms and treatment (*n* = 183)

Statements	Yes	%	No	%
Fever for 3-5 days is a symptom of dengue	174	95.1	9	4.9
Headache is a symptom of dengue	169	92.3	14	7.7
Joint pain is a symptom of dengue	168	91.8	15	8.2
Muscle pain is a symptom of dengue	133	72.7	50	27.3
Pain behind the eyes is a symptom of dengue	109	59.6	74	40.4
Skin rashes are symptoms of dengue	138	75.4	45	24.6
Abdominal pain is a symptom of dengue	72	39.3	111	60.7
Heart attack is a symptom of dengue	9	4.9	174	95.1
Antibiotics are medicines against dengue	141	77.0	42	23.0
Antimalarial drugs are medicines against dengue	56	30.6	127	69.4
Antipyretics are medicines against dengue	145	79.2	38	20.8
Pain killers are medicines against dengue	71	38.8	112	61.2
Herbs/traditional drugs are medicines against dengue	53	29.0	130	71

Most of the respondents had very good knowledge about preventive measures, such as covering water containers (98.4%), cleaning garbage (94.5%), and using mosquito bed nets (96.2%). Yet, more than two-thirds (67.8%) believed that dengue vaccination is one of the preventive measures [Table 4].

Table 3: Responses on knowledge of dengue causes, vector characteristics, and transmission (*n*=183)

Statements	Yes	%	No	%
Bacteria causes dengue infection	64	35.0	119	65
Virus causes dengue infection	157	85.8	26	14.2
Dengue is distributed in tropical and sub-tropical climate areas	176	96.2	7	3.8
Dengue is distributed in temperate climate areas	30	16.4	153	83.6
Dengue is distributed in polar climate areas	10	5.5	173	94.5
It is likely to catch dengue in Malaysia	166	90.7	17	9.3
It is likely to catch dengue outside Malaysia	112	61.2	71	38.8
All types of mosquito transmit dengue	24	13.1	159	86.9
<i>Aedes</i> mosquitos transmit dengue	179	97.8	4	2.2
Dengue mosquitos likely to bite at sunrise	126	68.9	57	31.1
Dengue mosquitos likely to bite at sunset	169	92.3	14	7.7
Dengue mosquitos likely to bite at noon	17	9.3	166	90.7
Dengue mosquitos likely to bite at night	88	48.1	95	51.9
Mosquitos breed in clean stagnant water	155	84.7	28	15.3
Mosquitos breed in dirty stagnant water	113	61.7	70	38.3
Mosquitos breed in clean running water	13	7.1	170	92.9
Mosquitos breed in dirty running water	35	19.1	148	80.9
Mosquitos breed in garbage	147	80.3	36	19.7
Dengue can be contracted by drinking dirty water	48	26.2	135	73.8
Dengue can be contracted by eating unhygienic food	37	20.2	146	79.8
Person-to-person contact transmits dengue	15	8.2	168	91.8
Dengue can be transmitted by blood transfusion	106	57.9	77	42.1
Dengue can be transmitted by sexual intercourse	40	21.9	143	78.1

Table 4: Responses on knowledge of dengue preventive measures (*n*=183)

Statements	Yes	%	No	%
Personal protection measures				
Insecticide sprays reduce mosquitos and prevent dengue	169	92.3	14	7.7
Mosquito coils/liquids/vaporizers reduce mosquitos and prevent dengue	175	95.6	8	4.4
Window screening prevents dengue	124	67.8	59	32.2
Mosquito bed nets prevent dengue	176	96.2	7	3.8
Mosquito repellents prevent dengue	166	90.7	17	9.3
Covering body with clothes prevents dengue	124	67.8	59	32.2
Vaccination prevents dengue	124	67.8	59	32.2
Vector control measures				
Cleaning garbage reduces mosquitos and prevents dengue	173	94.5	10	5.5
Preventing water from stagnation reduces mosquitos and prevents dengue	183	100	0	0
Covering water containers reduces mosquitos and prevents dengue	180	98.4	3	1.6
Changing water in storage tanks reduces mosquitos and prevents dengue	152	83.1	31	16.9
Cutting trees/vegetation reduces mosquitos and prevents dengue	152	83.1	31	16.9
Fogging reduces mosquitos and prevents dengue	155	84.7	28	15.3
Electrocutor reduces mosquitos and prevents dengue	145	79.2	38	20.8
Electric fan reduces mosquitos and prevents dengue	66	36.1	117	63.9
Use of smoke to drive away mosquitos prevents dengue	131	71.6	52	28.4

Figure 1 demonstrates the comparison between different sources of information on dengue.

Attitude Toward Dengue

The vast majority of the respondents perceived that dengue is one of the most serious health problems (97.3%) and there is a need for preventive actions (91.8%). 78 cadets (42.7%) felt that it is unlikely to survive after dengue.

Practices of Dengue Prevention

More than a half of participants always eliminated stagnant water around the house (61.7%) and covered water containers (59.0%). About one-third always practiced wearing protective clothes (65, 35.5%), cut trees/vegetation around the house (65, 35.5%), used mosquito coils/liquids/vaporizers (62, 33.9%), electric fan (59, 32.2%), and mosquito bed net (50, 27.2%). A little portion always used insecticide spray (44, 24.0%), and window/doors screen (42, 23.0%).

DISCUSSION

The ability to recognize the disease is crucial for seeking adequate medical care in a timely fashion [9]. The results of this investigation demonstrated that respondents were knowledgeable of the symptoms of dengue, which correlates with the findings of previous studies in Pakistan [7] and Laos [1]. Knowledge about the treatment of dengue was relevantly insufficient. Large portion of cadets reported that dengue can be treated with antibiotics and antimalarial drugs. In contrast, the study among university students in Pakistan found that only 20.6% of them believed that antibiotics are used against dengue [10]. Thus, correct knowledge regarding treatment should be provided to people to prevent harmful self-treatment practices and encourage seeking early cure in the health facilities.

Knowledge about causes of dengue was high. This result is in keeping with the results obtained in Trinidad and Tobago [3], Malaysia [6], and Philippines [8]. In our study, the majority of the respondent reported that virus is the cause of dengue, which is inconsistent with similar study among the semi-urban community in Malaysia where only a few respondents knew that

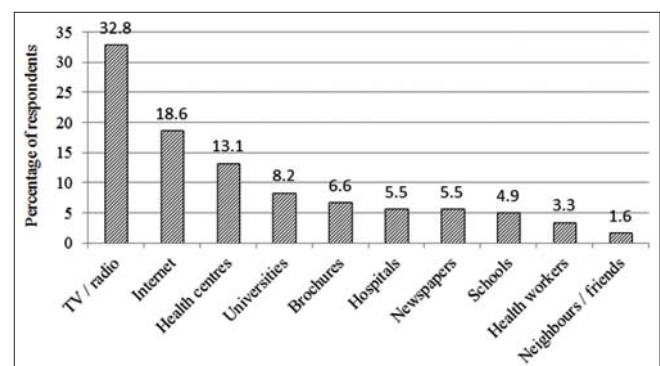


Figure 1: Sources of information on dengue

dengue is a viral disease [11]. Only two-third believed that this disease is likely to be caught outside Malaysia. This finding is important because it is highly probable that the cadets will be deployed in future outside Malaysia in the countries endemic of dengue. Most of the respondents knew that *Aedes* mosquitos bite at sunset and sunrise. Previous studies in Malaysia [11] and Pakistan [10] reported that only half of their respondents were aware of the *Aedes* daytime biting habits. This survey confirmed what was found in previous studies in rural Malaysia [6], Laos [1], and Pakistan [10] that most participants knew that stagnant water was common mosquito breeding place. This is inconsistent with the findings from survey among Pakistani university students whereby only 47.6% of the participants correctly identified clean stagnant water as the most common breeding site [10]. The knowledge on other breeding sites, such as running water is similar to the results of other studies [7].

In general, the cadets had right notions about dengue transmission. However, about a quarter of the respondents believed that dengue can be transmitted through sexual intercourse, drinking dirty water or eating unhygienic food, thus supporting the results of other published data [10,11]. Blood transfusion was reported as possible way of dengue transmission by more than a half of the respondents of this study which is consistent with other studies in Malaysia [6].

Relatively high knowledge of dengue vector characteristics and transmission correlated with good knowledge on personal protection and vector control measures of the majority of cadets. Thus, the high percentage of those who knew that stagnant water is the most common mosquito breeding site corresponded to the high proportion of those who reported container protection practices. The results of previous studies were inconsistent with our findings. In two studies in Pakistan, only 18% [12] and 10.8% [7] of the respondents knew that changing water in storage tank is a vector control practice. This may be due to intensified dengue educational efforts of the Malaysian government. However, almost three-fourth of the cadets wrongly assumed that vaccination is used in the prevention against dengue.

Findings of this study indicated that television and radio were the most cited sources of information on dengue which is consistent with previous studies in Malaysia [10,13], Philippines [8], and Pakistan [7]. Not surprisingly for the study population of young people that the internet was reported as the second most useful source. Health workers as sources of the dengue information were cited by only a few proportion of the respondents despite the potential of the health institutions in communicating dengue preventive measures. For example, it was suggested that health authorities could produce videotaped material with the performance of desired behaviors [13].

With regards to the attitudes toward dengue, most of the respondents considered it serious health problem and almost a half expressed strong fear about dengue; besides, the vast majority felt that there is a need for prevention. This is inconsistent with data from previous study among selected population in Malaysia, wherein only a few of the respondents

had fear against dengue and about one-third believed that some of the vector control measures is waste of time [6].

This study showed a relationship between dengue knowledge and container protection practices. However, a smaller proportion of the cadets practiced other dengue prevention, such as wearing protective clothes and using insecticide sprays, to a “greater extent” despite good knowledge and attitudes.

Our study suggests that increasing knowledge about dengue alone would not be sufficient to encourage people to engage in dengue preventive practices. Some of the previous studies reported that good knowledge necessarily leads to good practice [1,6,10]. This is not what was found in this study. Key finding of this work was that good knowledge does not necessarily translate into better preventive practices against dengue. Similar result was obtained in Philippines whereas the authors suggested that people stop doing good practice despite having good knowledge when there is no continuous monitoring [8]. Besides, we found that having the right attitude does not necessarily mean being motivated to translate it into practice. The same trend was observed in Laos [1]. This indicates that we need more aggressive continuous health education campaigns among military cadets, which address the factors of individual compliance and sustainability of dengue control programs.

There were certain limitations in the present study. Cross-sectional design implies that the findings may change over time. Our study was conducted among the population of military cadets, so it is questionable whether the results can be generalized to civilian population.

Nevertheless, findings from this study provide useful inputs as it is the first analysis on dengue behavior conducted among military cadets in Malaysia. Further research would benefit from adopting more detailed design and analysis.

CONCLUSION

It could be inferred from our study that despite some misconceptions dengue knowledge and attitudes among military cadets in Malaysia are rather high. However, cadets are not sufficiently motivated to translate good knowledge and attitudes into improved practice. This study emphasizes the need for continuous monitoring of good preventive practices and aggressive health education regarding dengue. Our findings provide an appropriate format to evaluate existing problems and develop effective strategies for health behavioral change.

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