

A Comparative Study on Dengue Knowledge and Preventive Practices between Pre-University and University Military Students

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ABSTRACT

Background and aim: Dengue has a significant impact on the health and readiness for combat of military personnel, especially during the deployment. Exploring the factors that affect behaviour and practices on dengue among military populations is essential for implementation of effective prevention and controls interventions. This study is aimed to assess whether education and military training at the National Defence University of Malaysia affect knowledge and practices regarding dengue among military students.

Methods: The comparative analysis of knowledge and practices with regard to dengue among 70 pre-university and 66 university (Year 2) students was based on the results of the descriptive cross-sectional study which was conducted with 183 participants selected by the convenience sampling method. A structured pre-tested questionnaire was used.

Results: Knowledge on dengue was significantly better among university students with respect to mosquito repellents ($p = 0.012$), protective clothing ($p = 0.050$), fogging ($p = 0.001$), and absence of dengue vaccination ($p < 0.0005$). 72.8% of university students compared to 48.6% of pre-university students ($p = 0.036$) thought that dengue was “very likely” or “likely” to be contracted not only in Malaysia but in other countries as well. Additionally, smaller percentage of university students compared to pre-university responded that dengue was transmitted by drinking dirty water ($p = 0.014$), caused by bacteria ($p = 0.006$), and treated by antimalarial drugs ($p = 0.033$). Regarding practices, 81.8% of university students compared to 72.8% of the pre-university students used window screening “always”, “often” or “sometimes” ($p = 0.005$).

Conclusion: This study found a significant association between knowledge and practices regarding dengue and education level among military students. Thus, education of military personnel is an important factor that enhances the involvement of the servicemen into dengue prevention and control interventions.

Keywords: dengue, knowledge and preventive practices, pre-university and university military students

INTRODUCTION

Dengue is a major public health problem in Malaysia. The incidence is increasing and geographical distribution of both the dengue virus and the mosquito vector is expanding (Naimet *et al.*, 2014). Dengue is an infectious disease of military significance; non-battle casualties caused by dengue result in the loss of manpower and loading of the logistic chain (Kitchner, 2010). Additionally, military forces of Malaysia are deployed in several multinational operations contributing peace-keeping troops, as well as medical, engineering and logistical personnel (Sebeny & Chretien, 2013). The increased mobility of military populations from dengue endemic countries is associated with the global increase in dengue cases. Thus, by maintaining adequate dengue prevention and control programs Malaysian Armed Forces not only defend own military personnel but also may contribute to prevention of epidemics of global importance (Chretien *et al.*, 2007).

Human behavior is largely overlooked when considering knowledge, attitude and practice that could prevent this infection from having a devastating impact on health (Syed *et al.*, 2010). Exploring the factors that affect behaviour and practices on dengue among military populations is essential for implementation of effective prevention and controls interventions. Vector control and personal protection remain the most effective measures of limiting dengue transmission in the absence of vaccination or chemoprophylaxis (Gambel *et al.*, 1999). The lack of participation by military personnel is said to contribute to the failure of prevention and vector control programs (Pages *et al.*, 2010). Therefore, enforcement of existing preventive medicine doctrine is an essential prerequisite of effective interventions, especially during military deployments (Gambel *et al.*, 1999). Military officer cadets are future effective leaders and, inter alia, role models for the troops in disease prevention knowledge and practices. Thus, education efforts should account for developing cadets' knowledge about dengue and abilities to translate it into the armed forces' preventive practices. This study is aimed to assess the role of education and military training at the National Defence University of Malaysia (NDUM) in the development of dengue knowledge and practices among military students.

METHODS

A hundred eighty three (183) military students from the NDUM were recruited for a descriptive cross-sectional study. The design of the study, data collection methods and basic information are described in detail in accompanying study (Hamid *et al.*, 2015).

In short, the participants were selected by convenience sampling method, and provided with self-administered structured questionnaires that included questions regarding dengue knowledge, attitude and preventive practices as well as socio-demographic data.

For this analysis, dengue knowledge and practices among the pre-university students ($n = 70$) and university students ($n = 66$) were compared. Year 2 students were chosen as the „university“ group for comparison with the foundation students as the „pre-university“ group due to comparability of the study sample sizes (Table 1). Data were analysed using SPSS, version 21. Chi-square tests of association were conducted to evaluate the relationship between the level of education in the military institution and dengue knowledge, attitude and practices. We defined statistical significance as $p < 0.05$.

Table 1. Number and percentage of respondents by the academic year of study at NDUM ($n = 183$)

Academic year	n	%	Remarks
Year 1	41	22.4	
Year 2	66	36.1	
Year 3	5	2.7	
Year 4	0	0.0	(field exercise off campus)
Year 5	1	0.5	(field exercise off campus)
Foundation	70	38.3	

RESULTS

The responses of a total of one hundred thirty six (136) participants consisting of 70 pre-university and 66 university students were analysed. The distribution of the study subjects in two comparison groups by gender and previous experience of dengue is shown in Table 1.

Table 1. Distribution of pre-university and university students by gender and history of dengue ($n = 136$)

	Military students			
	Pre-university		University	
	n	%	n	%
Gender				
Male	41	58.6	45	68.2
Female	29	41.4	21	31.8
History of dengue				
Yes	9	12.9	7	10.6
No or did not remember	61	87.1	59	89.4

The association between knowledge of dengue symptoms and treatment, and education level is presented in Table 2. Overall, university students were slightly more knowledgeable than pre-university students. Having higher level of education was significantly associated with better knowledge of muscle pain ($p= 0.007$) and use of the following medicines against dengue:antimalarial drugs ($p= 0.033$), antipyretic drugs ($p= 0.011$) and traditional medicines ($p= 0.042$).

Table 2. Knowledge of dengue symptoms and treatment among study populations (n = 136)

Statements	Military students		<i>p</i> -value
	Pre-university n = 70 (%)	University n = 66 (%)	
Fever for 3-5 days is a symptom of dengue (yes)	95.7	95.5	0.941
Headache is a symptom of dengue (yes)	91.4	92.4	0.831
Joint pain is a symptom of dengue (yes)	88.6	95.5	0.141
Muscle pain is a symptom of dengue (yes)	62.9	83.3	0.007
Pain behind the eyes is a symptom of dengue (yes)	58.6	63.6	0.545
Skin rashes are symptoms of dengue (yes)	77.1	71.2	0.429
Abdominal pain is a symptom of dengue (yes)	40.0	37.9	0.800
Heart attack is a symptom of dengue (no)	95.7	95.5	0.941
Antibiotics are medicines against dengue (no)	14.3	27.3	0.061
Anti-malarial drugs are medicines against dengue (no)	65.7	81.8	0.033
Antipyretics are medicines against dengue (yes)	74.3	90.9	0.011
Pain-killers are medicines against dengue (yes)	34.3	51.5	0.042
Traditional drugs are medicines against dengue (no)	24.2	34.8	0.177

The knowledge of dengue causes was high in both groups, however, university students knew significantly better than pre-university students that bacteria do not cause dengue ($p = 0.006$). Significant association between higher education level and

better knowledge of vector characteristics was found in terms of likelihood of catching dengue in Malaysia ($p = 0.040$), and outside Malaysia ($p = 0.036$). However, only one (1.5%) university student reported that *Aedes* mosquito can bite at noon compared to 10 (14.3%) pre-university students ($p = 0.006$). Furthermore, knowledge of garbage as mosquito breeding site was inversely associated with the level of education. In terms of dengue transmission, university students demonstrated better knowledge; significant association was found between knowledge that dirty water does not transmit dengue ($p = 0.014$) and the level of education (Table 3).

Table 3. Knowledge of dengue causes, vector characteristics and transmission among study populations (n = 136)

Statements	Military students		p-value
	Pre-university n =70 (%)	University n =66 (%)	
Bacteria causes dengue infection (no)	51.4	74.2	0.006
Virus causes dengue infection (yes)	88.6	84.8	0.522
Dengue is distributed in tropical & subtropical climate areas (yes)	97.1	98.5	0.594
Dengue is distributed in temperate climate areas (no)	81.4	87.9	0.298
Dengue is distributed in polar climate areas (no)	94.3	95.5	0.758
It is likely to catch dengue in Malaysia	55.7	56.1	0.040
It is likely to catch dengue outside Malaysia	44.3	65.2	0.036
Dengue is transmitted by mosquito bites	98.6	98.5	0.967
All types of mosquito transmit dengue (no)	87.1	87.9	0.897
<i>Aedes</i> mosquitos transmit dengue (yes)	98.6	97.0	0.525
<i>Aedes</i> mosquitos likely to bite at sunrise (yes)	86.6	71.2	0.737
<i>Aedes</i> mosquitos likely to bite at sunset (yes)	90.0	93.9	0.400
<i>Aedes</i> mosquitos likely to bite at noon (yes)	14.3	1.5	0.006
<i>Aedes</i> mosquitos likely to bite at night (yes)	48.6	39.4	0.281
Mosquitos breed in clean stagnant water (yes)	84.3	84.8	0.928
Mosquitos breed in dirty stagnant water (yes)	72.9	62.1	0.181

Mosquitos breed in clean running water (no)	91.4	93.9	0.575
Mosquitos breed in dirty running water (no)	72.9	81.3	0.141
Mosquitos breed in garbage (yes)	92.9	77.3	0.010
Dengue can be contracted by drinking dirty water (no)	62.9	81.8	0.014
Dengue can be contracted by eating unhygienic food (no)	72.9	86.4	0.052
Person-to-person contact transmits dengue (no)	92.9	93.9	0.800
Dengue can be transmitted by blood transfusion (yes)	52.9	66.7	0.101
Dengue can be transmitted by sexual intercourse (no)	71.4	81.8	0.153

Regarding dengue preventive measures, the greater percentage of university students had knowledge of the following: mosquito coils/liquids/vaporizers, window screening, bed nets, mosquito repellents ($p= 0.012$), protective clothing, smoke to drive away mosquitoes, electrocutor, electric fan, fogging ($p= 0.001$), and absence of dengue vaccine ($p < 0.0005$).

Figure 1 demonstrates the sources of information on dengue according to the students' responses. The role of universities as useful information sources increased from 4.3% among pre-university students to 15.2% among university students.

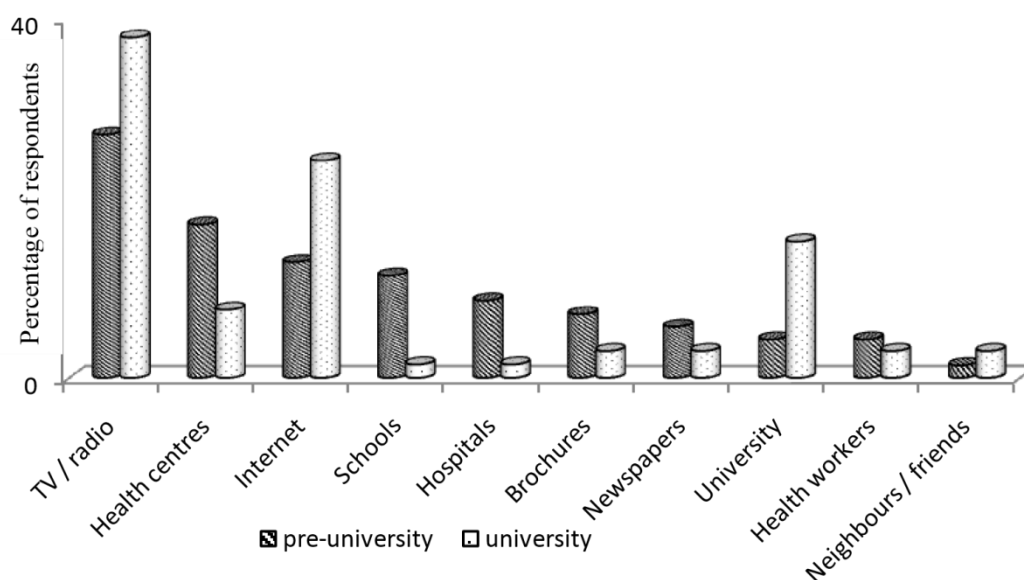


Figure 1. Sources of information on dengue reported by pre-university and university military students

Table 4 shows participants' self-reported prevention and control practices against dengue. The two measures that both pre-university and university students undertook to greater extent ("always") were eliminating stagnant water around the house (62.9% and 60.6% respectively) and covering water containers (48.6% and 62.1% respectively). Compliance with personal protection measures was lower in both groups. The practice of using window / door screening was significantly better among university students ($p= 0.005$).

Table 4. Practice of dengue preventive measures by study populations (n = 136)

Statement	Extent of Practice						p-value				
	Always (n)	%	Usually (n)	%	Sometimes (n)	%		Seldom (n)	%	Never (n)	%
Wear long sleeves and trousers:											
Pre-university students	25	35.728	40.015	21.41	1.41	1.4					
University students	23	34.819	28.819	28.85	7.60	0.0					0.212
Use insecticide spray:											
Pre-university students	16	22.922	31.416	22.913	18.63	4.3					
University students	13	19.717	25.824	36.49	13.63	4.5					0.531
Use windows / doors screening:											
Pre-university students	12	17.117	24.322	31.44	5.715	21.4					
University students	21	31.820	30.313	19.79	13.63	4.5					0.005
Use electric fan:											
Pre-university students	16	22.920	28.619	27.16	8.69	12.9					
University students	26	39.416	24.28	12.18	12.18	12.1					0.110
Use mosquito bed net:											
Pre-university students	20	28.69	12.910	14.315	21.416	22.9					
University students	19	28.811	16.714	21.28	12.114	21.2					0.551
Drain stagnant water around the house:											
Pre-university students	44	62.915	21.49	12.92	2.90	0.0					
University students	40	60.611	16.78	12.15	7.62	3.0					0.401
Cut trees/vegetation around the house:											
Pre-university students	24	34.317	24.317	24.37	10.05	7.1					
University students	24	36.411	16.713	19.712	18.26	9.1					0.539
Use mosquito coils/liquids/vaporizers											
Pre-university students	22	31.421	30.013	18.68	11.46	8.6					
University students	23	34.823	34.813	19.73	4.54	6.1					0.614
Cover water containers:											
Pre-university students	34	48.620	28.610	14.34	5.72	2.9					
University students	41	62.113	19.79	13.62	3.01	1.5					0.545
Use Abate as larvicide:											

Pre-university students	21	30.021	30.013	18.66	8.69	12.9
University students	30	45.58	12.111	16.710	15.27	10.60.068
Use repellent:						
Pre-university students	16	22.910	14.318	25.714	20.012	17.1
University students	20	30.312	18.221	31.88	12.117	12.50.261

Finally, this study did not find any significant association between attitudes towards dengue and the level of education. The vast majority of both pre-university and university students perceived dengue as serious health problem that requires preventive actions, and expressed fear against the disease.

DISCUSSION

In the present study, dengue knowledge, attitude and practices were compared between two groups of military students: pre-university students who joined the NDUM for foundation studies three-four months prior to our investigation and university students who had been exposed to education and training in the NDUM for two years.

The university students were slightly more knowledgeable in dengue symptoms and treatment, causes and transmission, vector characteristics, as well as preventive measures. The role of education in the enhancement of dengue knowledge is supported by almost four-fold greater percentage of university students that mentioned “university” as a source of information on dengue. This is consistent with findings from the previous studies in Malaysia (Naing *et al.*, 2011) and Pakistan (Itrat *et al.*, 2008; Syed *et al.*, 2010). For example, Itrat *et al.* (2008) found that having at least one certificate of education had significant association with better knowledge. In these studies the association between dengue knowledge and education was measured based on the cumulative scoring of the knowledge section. In contrast, we made the comparisons separately for each knowledge parameter, and found only few significant associations between educational level and dengue knowledge. Regarding self-reported practices against dengue, education was not an important factor, except for using window/door screening. This study did not find any significant association between attitudes and level of education. Both study groups reported strong positive attitudes towards dengue. This finding was not consistent with the previous study in Malaysia (Al Dubai *et al.*, 2013) that suggested a gap in respondents’ attitudes, and found a significant association between level of education and attitudes towards dengue.

The results of accompanying study (Hamid *et al.*, 2015) did not find significant association between dengue knowledge and practices among military students. The present study supports this finding by evidence on association of education with dengue knowledge, but not dengue practice.

Despite the importance of the data from this investigation as the first analysis of the association between educational level and dengue behaviour among military cadets, this study has some limitations. The imprecision of the sampling method may result in selection bias.

CONCLUSIONS

This study found that education of military students is an important factor that enhances their knowledge regarding dengue. However, for effective translation of this knowledge into practices health education programs should be more focused on encouragement of compliance with and continuous monitoring of preventive practices. Besides, military universities should account for various dengue knowledge parameters in developing health education programs for the cadets.

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