Risk Assessment on Dengue among UPM students

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ABSTRACT

Background:
This study assessed the level of risk of dengue infection in 17th College, Universiti Putra Malaysia and the association between knowledge, attitude and practice on dengue control with the risk perception of the residents.

Materials and Methods:
Risk of dengue was assessed using HIRARC and Aedes Index and the respondents who involved in this study were asked about the knowledge, attitude, and practice and risk perception on dengue. 17th College was identified as a high risk area.

Result:
There was significant association between knowledge and attitude (P<0.05) as well as between knowledge and practice (P<0.05). Interestingly, despite the overall positive attitude towards controlling dengue among the respondents, there were shortfall with the practice where they had poor knowledge with practice on dengue control.

Conclusion:
Therefore, actions need to be done to enhance their knowledge and practice on dengue control. Campaigns on dengue control should be organized to educate and encourage individuals to practice simple preventive actions, such as, use of insecticide, treated bed nets and screening of homes.

Key Words: dengue, HIRARC, Aedes Index, risk perception.
1.0 Introduction

Dengue fever which is also called as breakbone fever, is a mosquito-borne infection caused by a flavivirus (Brooks, 2007). Dengue is a severe, flu-like illness characterized by high fever, severe headaches, nausea, vomiting, muscle and joint pains, swollen glands or rash (WHO, 2014). Severe forms of the disease will be dengue hemorrhagic fever and dengue shock syndrome. Dengue fever is transmitted through the bite of Aedes Aegypti but can replicate within and transmitted by the other members of the genus Aedes including Aedes Albopictus where human acts as a main host. Since 1902, dengue fever has been endemic in Malaysia and reached epidemic proportions in 1973 where Malaysia experienced the worst outbreak since then (Murray, 1998). Dengue fever was first reported in 1902 in Penang and has become a major public health problem in Malaysia (MOH, 2003). Therefore, dengue control has been identified as a national priority by the Malaysian government.

Dengue has also put some 2.5 billion at risk in more than 100 countries (Lee et al. 2010) so do the 17th college where about 43% of dengue cases reported in Pusat Kesihatan Universiti, UPM till November 2013 were from 17th college, UPM. Risk assessment on dengue in Malaysia is usually done by calculating the house index or Aedes index, container index and Breteau index (Sanchez et al. 2006). Risk assessment is done to enable the public to plan, introduce and monitor preventive measures which will also ensure the risks are controlled. Risk of dengue can only be controlled by reducing the population of the dengue vector due to unavailability of any vaccine till now. Risk assessment on dengue will be a crucial way to alert the public on risk areas so that they are prepared to control the risk. Some studies show that the method of calculating indices is not an effective method in predicting dengue risk (Shah and Sani, 2012). Therefore, we are comparing the hazard identification, risk assessment and risk control (HIRARC) and Aedes index as an effective method for risk assessing on dengue among 17th college, UPM staffs and students.

2.0 Materials and Methods

2.1 Subjects

This study was conducted in 17th College, UPM from April to August 2014. This college were identified as having the highest number of dengue cases reported compare to other colleges in UPM. We conducted a cross-sectional study among the residents in 17th College, UPM. 38 houses were randomly selected for assessing risk and 130 residents were selected to answer the questionnaire.

2.2 Data collection

Assessing risk using HIRARC were done by interviewing health officers at Pusat Kesihatan Universiti (PKU). Information on dengue cases reported at 17th College, UPM from 2013 to recent cases. Information collected were the number of cases and severity of each case reported. These data was used to determine the likelihood and severity in assessing risk using HIRARC method. House inspection was also done in selected houses to determine the Aedes index in the study location. The student houses and hostel environment were inspected on any water-holding container containing larvae. The containers found presence of larvae, the larvae sample was collected and examined under microscope.
The questionnaire covered socio-demographic information (age, education, risk perception-low, moderate or high); knowledge on dengue (measured number of correct answer on dengue vector, symptoms, endemic season and controlling method); attitude on dengue control (measured using Likert’s scale on eliminating breeding sites, perception on fogging); practice on dengue control (measured by practices done by the respondents such as cover water containers, draining off water in the plates of flower pots and checking water containers in the toilet). All the information except the socio-demographic part were measured using score which were then classified into levels for knowledge (high, moderate or low); attitude (positive or negative); and practice (good or poor).

2.3 Data Analysis

Statistical analysis was performed using IBM SPSS version 21.0. Descriptive analysis was done to determine the risk assessment of dengue. Chi-square test was done to determine the association between the knowledge, attitude, and practice and risk perception. The level of significance in this study was set up at \( P < 0.05 \).

3.0 Result

Risk on dengue infection using HIRARC method was assessed where the likelihood fall on the 5th category and severity on the 3rd category. The value calculated was 15 which shows high risk based on the risk matrix. Aedes Index method showed a result of 5.3% which also fall in high risk.

![Figure 1: Distribution of respondents by (a) knowledge level (b) attitude level (c) practice level (d) risk perception](image-url)
Based on Figure 1, distribution of knowledge of the respondents showed that 33.9% has low knowledge, as well as 56.9% has moderate knowledge and 9.2% has high knowledge, as well as 56.9% has moderate knowledge and 9.2% has high knowledge (Figure 1(a)). Attitude level of the respondents attained showed 56.2% has positive attitude while the rest 43.9% has negative attitude in controlling dengue (Figure 1(b)).

Distribution of practice on dengue control of the respondents showed that 43.08% has good practice whereas 56.92% has poor practice (Figure 1(c)). Highest percentage of the respondents about 46.15% have low risk perception followed by 42.31% with moderate and lastly 11.54% with high risk perception (Figure 1(d)).

Figure 2: Statistically significant (P<0.05) correlations between knowledge on dengue, attitude, practice on dengue control and risk perception.

Figure 2 shows that there is a significant association between knowledge on dengue fever and attitude \( \chi^2 = 10.771, P<0.05 \) and practice on dengue control \( \chi^2 = 8.934, P<0.05 \). However, relationship between attitude and practice on dengue control failed to have a significant association. Association between the knowledge, attitude and practice on dengue control were not significantly associated with level of risk perception.

4.0 Discussion

4.1 Risk on dengue infection using HIRARC and Aedes Index (AI)

There was no previous study on assessing risk of dengue using HIRARC. However, based on the study on risk assessment using Aedes index, the result were complemented to each other. This shows HIRARC method can also be used to assess risk of dengue in a population. However, we should be cautious that in a study by Shah et al. (2011) states that Aedes Index is not an effective method in assessing risk of dengue.

Out of the 38 inspected houses, two of the houses were found to have Aedes larvae (5.3%) which falls under high risk group. Risk assessment using HIRARC method also indicates that 17th college falls under high risk group. This statement can be said supporting the dengue
cases reported in PKU where 17th college was the highest dengue cases reported throughout the year 2013 compared to other colleges in UPM. Therefore, based on both HIRARC and Aedes Index evaluations, 17th College was considered as high risk area for dengue infection which probably could explain the reason of highest number of dengue cases reported compare to other colleges in UPM.

4.2 Knowledge on dengue

The study reveals that most of the respondents have moderate level of knowledge towards dengue control where its overall percentage is 56.92%. However this percentage is higher than the knowledge level of dengue done at Maldives by Nahida et al. (2007) where the percentage of respondents having a moderate level of knowledge on dengue was 42.4%. In this study, almost all respondents agree that the dengue patients will have chills, headache, pain upon moving eyes and low backache which is 93.1% however a study done by Farizah et al. (2003), at Kuala Kangsar shows slightly lower which is 86.0%. Similar study also found by Hairi et al. (2003). Majority of the respondents knew that empty stagnant water from old tires, trash cans and flower pots can be breeding site for mosquitoes which the percentage is 93.8%, almost the same as study done by Mayxay et al. (2013).

In conclusion we can see that the respondents from 17th college having much higher percentage of the level of knowledge towards dengue compared to the previous studies. This is because the respondents were UPM students from Faculty of Medicine and Health Science and Faculty of Veterinary Medicine who are exposed to dengue issues throughout their medical education.

4.3 Attitude on dengue control

The majority of the respondents having a positive attitude towards the dengue control. Out of 100%, there are 56.15% got a score in between 45-60 which include them into positive group attitude. However, this percentage is higher than the level of attitude on dengue control done by Nahida and Taneepanichskul, (2007) at Maldives where her study result shows 42.5% respondents with positive attitude. The positive and negative statement from the study reflect the attitude of the respondents on dengue control. Although the percentage of respondents with a positive attitude is more than half, there is still a group of people with negative attitude which may increase their risk of getting dengue and can indirectly influence the group with a positive attitude.

4.4 Practice on dengue prevention

Out of 130 respondents, 74 of them were having poor practice on dengue prevention which represent 56.92%. This differs from the previous KAP study by Swati et al. (2014) at a tertiary care hospital in India that showed 82.1% of respondents having unsatisfactory or poor practice on dengue prevention. Even though study done by her showed a higher percentage than this study, but both clarify that most of the respondents have low practice towards the dengue prevention.
4.5 Risk perception on dengue

In this study, we found out that most of the respondents felt that they are safe from dengue infection. They do not feel that they are in a high risk to get dengue infection. Almost half of the respondents have low risk perception on dengue. This kind of perception can even determine their attitude or practice towards preventing dengue (Brewer, 2007). This can conclude that even if the respondents have good knowledge in dengue, their perception and attitude on preventing dengue will determine the risk of getting dengue in a particular population.

4.6 Association between knowledge, attitude and practice on dengue control

From association analysis, we found out that there was no association between attitude and practice on dengue control. However, there were association between knowledge and attitude, as well as between knowledge and practice. This study showed similar findings with the association between knowledge and attitude (Hairi, 2003; Kyu, 2005). Castro et al. 2013 also stated that there was no association of knowledge with practices. There was an association between knowledge and practice on dengue control which is similar to our findings (Al-Dubai, 2013). Kok, (2014) also supported our findings that there was no significant association between the attitude and practice on dengue control, a significant association was noted between knowledge and attitude on dengue control, but with contrary of no significant association between knowledge and practice on dengue control.

4.7 Association between KAP on dengue control and risk perception

This study found that the overall knowledge of dengue and Aedes was moderate. The attitude towards dengue control was far better, however, the practice of dengue control appeared to be less than attitude and knowledge. In addition there were no significant association between knowledge on dengue fever and risk perception which gave the same result in a study done by Castro et al. (2013). However, in previous study, it was proven that person with a good knowledge will have a better perception on risk (Wynberg, 2013). There were no significant association also between attitude on dengue control and risk perception. A study by Ėtbon et al. (2009) revealed that risk perception does not seem to be associated with attitude in the case of dengue fever. Risk perception can still be placed as a concept in determining attitude (Brewer, 2007). This study also showed that practice on dengue control were not significantly associate with the risk perception. This was comparable with the findings in a study done by Castro et al. (2013).

5.0 Conclusion and Recommendation

In conclusion, the attitude among respondents was good but the knowledge was moderate and practice on dengue control was poor. There were significant association between knowledge and attitude as well as between knowledge and practice. It is good for them to have an overall positive attitude, but not with poor knowledge and practice. Therefore, actions need to be done to enhance their knowledge and practice on dengue control. Campaigns on dengue
control should be organized to educate and encourage individuals to practice simple preventive actions, such as, use of insecticide, treated bed nets and screening of homes.

**Ethical**

Approval was obtained from the National Medical Research Register (NMRR) and Universiti Putra Malaysia Ethical Research Committee Involving Human Subject.

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**Declaration of conflict of interest**

We authors of the article declare that there is no conflict of interest regarding publication of this article.

**Authors contribution:**

a) Conception and design of the project: all authors  
b) Acquisition of data: Abdul Rahim, Hamizah, Olivia  
c) Writing of the manuscript: Abdul Rahim Awalludin, Hamizah Kamarul Jaman, Olivia Ling Jing, Dr. Mohd Rafee Baharudin, Assoc. Prof. Dr. Anita Abd Rahman  
d) Statistical analysis: Dr Hayati Kadir  
e) Critical review and significant revision of the manuscript: all authors

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