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KNOWLEDGE, ATTITUDE, AND PRACTICE ON PREVENTION OF DENGUE AMONG POSTGRADUATE INTERNATIONAL STUDENTS IN A PUBLIC UNIVERSITY IN MALAYSIA

LUAM GHEBREHIWOT GHEBREAB

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Dissertation Submitted to the Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia in Fulfillment of the Requirements for the Degree of Master of Public Health

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Chairman : Dr. Huda Zainuddin, MPH
Faculty : Medicine and health Sciences

Introduction: Dengue infection is one of the major vector-borne diseases and has become a public health concern throughout the world. Dengue fever has also become a burden among outsiders who travel to dengue endemic countries.

Objective: This study aims to identify the level of knowledge, attitude and practice on prevention of dengue infection among postgraduate international students in Universiti Putra Malaysia, Serdang and its predictors.

Methodology: A cross-sectional study was conducted among the postgraduate international students enrolled full-time in UPM using a multi-stage random sampling and proportionate to the number of students from each selected faculty. Data were collected using validated and self-administrated questionnaire. The collected data was computed and analyzed using IBM Statistical Package for Social Science (SPSS) version 22. Inferential statistics was used to assess the association between categorical variables using either Chi-Square or Fisher's exact test. The final models for predictors of good knowledge, attitude and practice were analyzed using logistic regression analyses. All the associations and predictors were considered significant at *P* less than 0.05.

Result: There were a total of 327 international students with 93.4% response rate. Majority of the students were male (70.3%), single (51.1%), master (56.3%) and Asians (52.3%) with median age of 32 (IQR 10). Most of the respondents showed good knowledge (69.7%), positive attitude (51.4%) and poor practice (60.9%) with 77.7% of the students having high perceived influence of mass media towards dengue infection.

Predictors of good knowledge were being a female (aOR = 2.236, 95% CI = 1.242 – 4.025, $P = 0.007$), respondents with history of dengue previously (aOR = 12.751, 95% CI =1.674 – 97.136, $P = 0.007$), those who stayed more than 18 months (aOR = 2.005, 95% CI = 1.240 – 3.242, $P = 0.007$) and respondents with high influence of mass media (aOR= 3.076, 95% CI = 1.784 – 5.572, $P \leq 0.001$). Predictors of positive attitude were, respondents older than 31-year-old (aOR = 1.718, 95% CI = 1.074 – 2.747, $P = 0.024$), high influence of mass media (aOR = 2.236, 95% CI = 1.242 – 4.025, $P = 0.007$), living in endemic country (aOR = 1.796, 95% CI =1.055 – 3.055, $P = 0.031$) and respondents from Africa (aOR = 0.443, 95% CI = 0.262 – 0.748, $P = 0.002$). Africans (aOR = 0.477, 95% CI = 0.270 – 0.845, $P = 0.011$) and participants with positive attitude (aOR = 2.928, 95% CI = 1.758 – 4.877, $P < 0.001$) were predictors of good practice.

Conclusion: The outcome of this study showed poor practice level of prevention on dengue, despite the respondents having an average level of knowledge and positive attitude. Hence, knowledge and attitude should be strengthened through the most utilized sources of information by giving ongoing health education and organizing campaigns regarding dengue preventive practices.

Key Words: Knowledge, Attitude, Practice, Dengue Infection, International students.

Abstrak disertasi yang dikemukakan kepada Jabatan Kesihatan Komuniti,
Universiti Putra Malaysia sebagai memenuhi keperluan untuk
Ijazah Sarjana Kesihatan Awam

PENGETAHUAN, TINGKAHLAKU, DAN AMALAN DALAM PENCEGAHAN DENGGI DI KALANGAN PELAJAR PASCA SISWAZAH DI UNIVERSITI AWAM DI MALAYSIA

Oleh

LUAM GHEBREHIWOT GHEBREAB

Ogos 2017

Pengerusi : Dr. Huda Zainuddin, MPH
Fakuliti : Perubatan dan Sains Kesihatan

Pengenalan: Demam denggi adalah salah satu penyakit bawaan vektor utama yang telah menjadi satu isu kesihatan awam yang membimbangkan di seluruh dunia. Deman denggi juga telah menjadi beban orang luar yang mengunjungi negara endemik.

Objektif: Kajian ini bertujuan untuk menentukan tahap pengetahuan, sikap, dan amalan pencegahan demam denggi serta peramal kepada pengetahuan yang baik, sikap dan amalan mengenai pencegahan jangkitan Denggi di kalangan pelajar antarabangsa pasca siswazah di Universiti Putra Malaysia, Serdang.

Metodologi: Kajian hirisan lintang telah dijalankan di kalangan pelajar antarabangsa sepenuh masa menggunakan persampelan rawak pelbagai peringkat dan berkadaran dengan saiz dari setiap fakulti yang dipilih. Data dikumpul dengan menggunakan borang soal selidik yang disi sendiri. Data yang dikumpul telah dikira dan dianalisa menggunakan IBM Statistical Package for Social Science (SPSS) versi 22. Statistik inferensi digunakan untuk mengukur hubungan antara pembolehubah menggunakan ujian Chi-Square atau ujian Fisher's Exact. Model akhir bagi peramal pengetahuan yang baik, sikap dan amalan telah dianalisa menggunakan ujian regresi logistik. Hubungan pembolehubah dan peramal dianggap signifikan pada *P* kurang daripada 0.05.

Keputusan: Terdapat sejumlah 327 pelajar antarabangsa dengan kadar respons 93.4%. Majoriti pelajar ialah lelaki (70.3%), bujang (51.1%), jurusan sarjana (56.3%) dan berasal dari negara Asia (52.3%) dengan median umur 32 (IQR 10). Kebanyakan responden menunjukkan pengetahuan yang baik (69.7%), sikap positif (51.4) dan

amalan tidak baik (39.1) terhadap pencegahan jangkitan denggi dengan 77.7% daripada pelajar mempunyai pengaruh tanggapan media massa yang tinggi terhadap jangkitan virus denggi. Peramal kepada pengetahuan pencegahan denggi yang baik termasuk sebagai wanita (*adjusted odds ratio* (aOR = 2.236, 95% CI = 1.242 – 4.025, $P = 0.007$), responden yang mempunyai sejarah denggi sebelum ini (aOR = 12.751, 95% CI = 1.674 – 97.136, $P = 0.007$), mereka yang tinggal di Malaysia lebih daripada 18 bulan (aOR = 2.005, 95% CI = 1.240 – 3.242, $P = 0.007$) dan responden dengan pengaruh media massa yang tinggi (aOR = 3.076, 95% CI = 1.784 – 5.572, $P \leq 0.001$). Peramal kepada sikap positif termasuk responden berumur lebih daripada 31 tahun (aOR = 1.718, 95% CI = 1.074 – 2.747, $P = 0.024$), pengaruh media massa yang tinggi (aOR = 2.236, 95% CI = 1.242 – 4.025, $P = 0.007$) dan tinggal di negara endemik (aOR = 1.796, 95% CI = 1.055 – 3.055, $P = 0.031$) dan responden dari Afrika (aOR = 0.443, 95% CI = 0.262 – 0.748, $P = 0.002$). Orang Afrika (aOR = 0.477, 95% CI = 0.270 – 0.845, $P = 0.011$) dan responden dengan sikap positif (aOR = 2.928, 95% CI = 1.758 – 4.877, $P < 0.001$) adalah peramal kepada amalan yang baik.

Kesimpulan: Hasil kajian menunjukkan tahap amalan masih rendah bagi pencegahan denggi, walaupun responden mempunyai tahap pengetahuan dan sikap positif yang sederhana. Oleh itu, tahap pengetahuan dan sikap positif perlu diperkukuhkan melalui pendidikan kesihatan berterusan dan penganjuran kempen mengenai amalan pencegahan demam denggi.

Kata Kunci: Pengetahuan, Sikap, Amalan, Demam Denggi, pelajar antarabangsa

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I certify that a dissertation Examination Committee has met on 2nd August 2017 to conduct the final examination of Luam Ghebrehiwot Ghebreab on her dissertation entitled "Knowledge, Attitude, and Practice on Prevention of Dengue among Postgraduate International Students in a Public University in Malaysia" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the (insert the name of relevant degree).

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This dissertation was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Public Health. The members of the Supervisory Committee were as follows:

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Signature: _____
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LIST OF ABBREVIATIONS

aOR	Adjusted Odds Ratio
CAM	Complementary and Alternative Medicine
CI	Confidence Interval
cOR	Crude Odds Ratio
Df	Degree of Freedom
DHF	Dengue Hemorrhagic Fever
DSS	Dengue Shock Syndrome
DV	Dependent Variable
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IQR	Inter Quartile Range
IV	Independent Variable
IVM	Integrated Vector Management
JKEUPM	Ethical Committee for Research Involving Human Subjects of Universiti Putra Malaysia
Kg	Kilogram
Ml	Milliliter
N	Sample Size
N	Number
NS1	Non-Structural Protein 1
Ph.D.	Doctor of Philosophy
RNA	Ribonucleic Acid
RT-PCR	Reverse Transcription-Polymerase Chain Reaction
SD	Standard Deviation
SPSS	Statistical Package for Social Science
UPM	Universiti Putra Malaysia
IVF	Variance Inflation Factor
WBC	White Blood Cells
WHO	World Health Organization
χ^2	Chi Square

CHAPTER 1

INTRODUCTION

1.1 Background

Dengue infection is one of the major vector-borne diseases transmitted from one person to another person through an infected mosquito bite. The *Aedes aegypti* is the primary vector for the dengue infection followed by the *Aedes Albopictus*. The infection is caused by the dengue fever virus, an RNA virus belonging to the *flaviviridae* family, *flavivirus* genus. There are 4 serotypes of the virus identified, DEN-1, DEN-2, DEN-3, DEN-4 (WHO, 2009). Once infected, symptoms vary from simple flu-like to severe dengue infection, which might result in shock caused by dengue hemorrhagic fever or dengue shock syndrome. It is transmitted from one infected individual to another when bitten by an infected mosquito (WHO, 2016c).

From the reports World Health Organization (WHO) released in 2012, the global incidence of dengue fever has shown a dramatic 30-fold increase over the past 50 years and it remains a major public-health concern throughout tropical and sub-tropical regions of the world (WHO, 2012a). As per the World Health Organization (2016), it is estimated that 50–100 million dengue infections occur annually with almost half the world's population living in countries where dengue is endemic.

It is estimated that up to 75% of the population living in the Asia-Pacific region are potentially exposed to the disease with this steady increase in incidence (WHO, 2012a). Economic and disease burden of dengue in Southeast Asia study at the 95% certainty level limits attained estimate for the total number of cases and the unit cost per dengue episode, it obtained an overall annual economic burden of dengue of US$ 950 million (US$ 610million – US$ 1,384million (Shepard, Undurraga, & Halasa, 2013)

The proper knowledge and attitude of dengue control, prevention, and management of the disease becomes a concern specifically to those living in dengue endemic areas. The Merriam-Webster dictionary defines knowledge as: "the state of being aware of information, understanding, or skill that you get from experience or education". The dictionary also defined prevention as: "the act or practice of stopping something bad from happening". Prevention programs are more effective if the knowledge and vector control practices of the population are understood and applied in the mainstream of intervention activities (Al-dubai et al., 2013). Furthermore, several studies suggest better knowledge of dengue and vector prevention practices as predictors of efficacy of dengue prevention (Alobuia, Missikpode, & Aung, 2016; Itrat et al., 2008).

Regarding general knowledge, attitude, and practices of dengue infection in Malaysia, a nationwide survey among Malaysians was conducted by Wong et al. The study results were, the mean total knowledge score for the overall sample was 27.49 (SD ± 8.34), out of a possible score of 42 which was moderate, though most the participants; 72.8% had a total dengue prevention practice score in the range of 51–100. Respondents with a lower total knowledge score range were less likely to have higher score practice on dengue prevention (OR = 0.42; 95% CI = 0.34 – 0.51; *P* = 0.001), thus the researchers concluded that there is a need of extensive dengue educational campaigns among people who have poor knowledge of dengue in order to encourage dengue prevention and control practices (Wong, Shakir, Atefi, & AbuBakar, 2015). Another cross-sectional survey among 300 Malaysians in different geographical locations (urban, semi-urban and rural) showed 96% of the participants were either not afraid of the disease or were unaware of its complications. Moreover, their practice was associated significantly with knowledge on dengue fever (*P* = 0.030) (Radman, S. A., Rahman, & Ahmed, 2013).

Dengue is also one of the top public health problems with an escalating rate on those individuals who are traveling to the endemic area. Dengue infection is as well the leading cause of febrile illness among international travelers which accounts for up to 16% of all febrile illnesses in returned travelers from dengue endemic or non-endemic countries (Ratnam, Leder, Black, & Torresi, 2013). Two percent of all illness in travelers returning from dengue-endemic regions is caused by dengue infection (Wilder-Smith, 2013). Ericsson et al also reported that the incidence of dengue in international travelers is rising which could be explained by the increasing number of tourists and other visitors visiting the dengue-endemic regions. The incidence rate of dengue among travelers is 14.6 per 1,000 person-months according to one study among travelers from Netherlands (Baaten et al., 2011), imported most commonly from South-east Asia (51%) (Schwartz et al., 2008).

The good knowledge, attitude and practice of prevention are the mainstay of reducing dengue among international visitors and locals. However, the international students in Universiti Putra Malaysia (UPM), Serdang had poor knowledge (45.9%), showed negative attitude (51.6%) and relatively moderate good practices on dengue fever prevention (53.7%) and the significant predictor for poor practices were negative attitudes towards practice, and poor knowledge on dengue fever (aOR=3.705, 95% CI = 2.532 – 5.421, *P* < 0.001) and (aOR = 0.169, 95% CI = 0.090 – 0.319, *P* < 0.001) respectively (Rao,Minhat & Hayati, 2016). In this study among international students, the authors identified the predictors of poor practice, but associated factors of good knowledge and attitude of students towards dengue infection prevention was not reported, which is an important component needed to be studied. In general, the UPM students lack comprehensive knowledge and had poor practices on dengue infection prevention (Rahim, Olivia & Rafee, 2016). Since there are considerable numbers of international students in the UPM, there is a need to explore the current prevalence and the associated aspects related to knowledge, attitude and practice of dengue fever prevention.

1.2 Problem Statement

The global incidence of dengue increased significantly within the past two decades. The number of symptomatic dengue infections more than doubled every 10 years in between 1990 to 2013 giving estimated incidence range of 50 million to 100 million cases per year. The number of cases increased from 8.3 million (95% CI = 3.3 million – 17.2 million) cases in 1990 to a peak of 58.4 million (95% CI = 23.6 million – 121.9 million) cases in 2013. Dengue is also responsible for 1.14 million (95% CI = 0.73 million – 1.98 million) disability-adjusted-life-years in 2013 (Stanaway et al., 2016) out of which Asia alone bore 70% of this burden (Bhatt & et al, 2013).

The dengue situation in Malaysia is a healthcare threat as a result of a tremendous increase in the trend of incidence of the diseases' reported cases and death during the last two decades (Mia, Begum, Er, Abidin, & Pereira, 2013). From 1995 to 2015 there was an increase of dengue infection cases from 6543 to 120,836 respectively and from 28 dengue caused deaths in 1995 to 336 deaths in 2015 (Ministry of Health, 2016a). The annual economic burden in Malaysia is considerably high, over the decade of 2001 – 2010 it was estimated as high as about US$ 128m or about US$ 4.73 (95% CI = 3.34 – 6.71) per capita in 2010 only (Shepard et al., 2013).

UPM is in the state of Selangor, which is one of the states with the highest number of reports on dengue fever and number of hot spots in Malaysia. The state is home to most of the nation's hotspots for dengue fever with overcrowding and lack of cleanliness in high-risk areas as the major risk factors (Ministry of Health, 2016c). In 2013 and December 2016, Selangor reported 23,852 and 94,812 of dengue cases respectively (Ministry of Health, 2016d). When comparing 2016 report of dengue cases, it is 4 times higher the number of dengue cases in the whole nation reported in 2013 (Gill, 2017). Unpublished data retrieved from University health center (PKU) in UPM reported an average of 42 cases per year from 2013 to 2016. If dengue fever gets complicated there is a need of hospitalization in some cases. One study reported that the median duration of hospital stays among adults was 5 to 6 days ($P< 0.0001$) (Lee et al., 2016), and some can stay up to 9 days (Aroor, Saya, Sharma, Venkatesh, & Alva, 2015). Thus, the burden of the dengue infection can cause substantial amount of problems on the victims and as a result on the academic aspect of the individuals involved.

Additionally, in 2010 it was reported that there were high-density *Aedes albopictus* which is the second main vector for dengue transmission in UPM. The study exhibited high egg density and larvae density with the abundance of *Aedes albopictus* population outdoor (Maimusa, Jambari, Yahya, & Ahmad, 2012). The mosquito threshold for egg density and larva indices per ovi-traps differ according to different localities but the finding inside UPM was higher than the threshold in Taiwan and Thailand (CDC, 2016b). Moreover, according to the UPM official website, in 2011 UPM had a total of 31,000 students and around 40% of them used to live in the campus in 17 residential hostels. The population is at its maximum during day time when about another 6,000 lecturers and workers are around. These figures emphasize on how densely populated the university is during the academic year.

In the recent years, there has been a massive influx of international students in Malaysia, more than 93,000 students from 100 countries since 2011 (Higher Education Malaysia, 2015). As retrieved from the official website, in UPM, approximately 20% of the students are international students and the overall prevalence of dengue fever in Malaysia includes international individuals who are studying as well as working. A study as well identified that one of the contributing factors for the widespread of the dengue infection in Malaysia is attributed to the movement of newcomers with poor knowledge and attitude (Wong YM & Zainal Abidin, 2013).

Thus, it is important to study the prevalence and the factors associated with knowledge, attitude, and practices on prevention of dengue infection among UPM staffs and students as well as international students. There are several studies among local students however, studies among international students are limited. Moreover, the evolving pattern of dengue infection and the correlation with outsiders (foreigners) prompted to the interest of this present study.

1.3 Significance of Study

The finding from this study will be able to provide baseline knowledge, attitude, and practice on prevention of dengue infection among postgraduate international students of UPM for. The data obtained can also be used as a basis for further interventional studies based on these research findings. Based on the finding of this study regarding respondents' source of information about dengue infection, the most utilized mass media identified can be used to educate students about dengue infection prevention. Subsequently identifying the level of knowledge, attitude, and practices of dengue infection prevention could contribute to relevant authorities in the university as a guideline in reviewing strategic plan related to dengue infection practices of prevention. The outcome of the study could also help as a guide in making policy on internationals under academic sectors regarding dengue prevention.

1.4 Research Questions

1. What is the level of knowledge, attitude, and practice on prevention of dengue infection among UPM postgraduate international students?

2. What is the distribution of postgraduate international students based on sociodemographic information (age, gender, nationality, education, and marital status), source of information and its perceived influence, previous history of dengue (on respondents and close family), duration of stay in Malaysia, knowledge, attitude and practice on prevention of dengue infection?

3. What are the association of sociodemographic information (age, gender, nationality, education and marital status), the source of information and its influence, previous history of dengue (on respondents and close family), duration of stay in Malaysia and knowledge, attitude and practice on prevention of dengue infection?

4. What is the association of knowledge, attitude, and practice on prevention of dengue infection?

5. What are the predictors of good knowledge, positive attitude, and good practice on prevention of dengue infection among UPM postgraduate international students?

1.5 Objectives of the Study

1.5.1 General Objective

To determine the level of knowledge, attitude, and practice on prevention of dengue infection and predictors of good knowledge, attitude, and practice on prevention of dengue infection among UPM international students

1.5.2 Specific Objective

The specific objectives of this study are to:

1. Determine the distribution of
   - i. Knowledge, attitude, and practice on prevention of dengue infection.
   - ii. Socio-demographic information (age, gender, and marital status, the level of education, faculty/department, marital status and nationality).
   - iii. Duration of stay in Malaysia, previous history of dengue (on respondents and family or close friends) and source of information and its perceived influence towards knowledge and practice.

2. Determine the association of knowledge, attitude and practice on prevention of dengue infection and
   i. Sociodemographic info (age, gender, marital status, level of education, faculty, marital status and nationality),
   ii. Duration of stay in Malaysia, Previous history of dengue (on respondents and family or close friends) and source of information and its perceived influence towards knowledge and practice.

3. Determine the association of knowledge, attitude, and practice of prevention.

4. Determine the predictors of good knowledge, positive attitude, and good practices on prevention of dengue infection among UPM international students.

1.6 Research Hypotheses

1. There is a significant association between sociodemographic information (age, gender, marital status, the level of education, faculty/department, marital status and nationality) with knowledge, attitude, and practices on prevention of dengue infection among respondents.

2. There is a significant association between the duration of stay in Malaysia, previous history of dengue (on respondents and family or close friends) and source of information and its perceived influence towards knowledge with practice and knowledge, attitude, and practice on prevention among respondents.

3. There is significant association of knowledge, attitude, and practice on prevention of dengue infection among respondents.

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