Community perception towards Dengue and Dengue Prevention Program among residences of a rural settlement in Jempol, Negeri Sembilan.

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Abstract:

Introduction: Dengue is a mosquito-borne infection which is a global health problem. The prevalence of dengue in Malaysia up to March 2014 showed an increasing trend in morbidity as well as mortality. Therefore this study was done to determine the perception on dengue and dengue prevention program among residents in a rural settlement.

Methodology: A cross-sectional study design and based on cluster sampling, resident aged 18 years old and above was randomly chosen. Data was collected using assisted self-administered questionnaire that covered knowledge and the six subcomponents of the Health Belief Model (HBM) i.e. perceived susceptibility, perceived barrier, perceived benefits, perceived barriers, perceived self-efficacy and cues to act. Data was analyzed using SPSS version 21 of significant level α=.05.

Results: A total of 306 residents' participated the study giving a response rate of 96.8%. Approximately half of the respondents' was female (57.6%), aged more than 50 years old (47.7%), had attained education up to secondary school (54.9%) and have lived in the settlement for 20 to 30 years (55.9%). Almost all the respondents were of Malay ethnicity and earn an income of less than RM2000 per month (92.2%). Majority of residents had correct knowledge on the cause of dengue (91.5%), symptoms of dengue (74-93.5%) and location of mosquitoes breeding (54.9- 98%). However, despite having good knowledge, one third of them perceived they have low susceptibility towards dengue, fogging activities is harmful and inconvenient as well as prevention of dengue fever should be handled totally by the government authorities.

Conclusion: The study found that despite satisfactory knowledge on dengue and its preventive program, perception based on HBM that reflects the healthy behaviour among resident was still an issue that needs to be tackled to achieve successful prevention and control program.

Key Words: dengue, dengue prevention, community perception, health belief model (HBM).

1.0 Introduction:

Dengue is a global health problem where it has been classified as the most important mosquito-borne viral disease in the world due to significant geographic spread of the virus and its vector. (World Health Organization, 2009). Several identified risk factors including rapid population growth, rural-urban migration, inadequate basic urban infrastructure (eg. unreliable water supply leading householders to store water in containers close to homes) and increase in volume of solid waste, such as discarded plastic containers and other abandoned items which provide larval habitats in populated areas. These factors combined with environmental conditions in developing countries enhances the favor for viral transmission. Hence this rapidly increasing disease which is described as endemic in many countries especially the tropical and subtropical countries has caused increasing health and economic burden (World Health Organization, 2009). The incidence rate for dengue in 2013 was 74.65 per 100 000 population with a mortality rate of 0.12 (Ministry of Health Malaysia, 2013) and over the last decade the trend has raised much concern where a study have shown that the number of dengue cases and number of deaths reported has increased on an average of 14% and 8% per year respectively (Mia, Rawshan, Er, Zainal Abidin & Pereira, 2013). Based on a study by Ahmad Nizal et al., (2012) that looked at dengue infections and the circulating serotypes in Negeri Sembilan, it was reported that all four dengue serotypes (DEN 1–4) were present with DEN-2 and DEN-3 being the most predominant serotypes. In addition, it revealed that despite recognition of dengue fever as the most important arboviral disease affecting humans, and inspite of a greater emphasis on community-based control approaches, the burden placed on the communities, countries, and regions affected by this disease continues to rise. Therefore in 2009, Malaysia started to implement the National Strategic Plan for Dengue (2009-2013) aiming to reduce the cases of dengue by half within 5 years. The strengthening on dengue prevention and control is carried through 7 strategies: i) surveillance system, ii) integrated vector management, iii) dengue case management, iv) communication and social mobilization, v) dengue outbreak response, vi) dengue research and vii) dengue strategic plan (Ministry of Health Malaysia, 2010).

A good dengue prevention program demands full involvement of the community. Various studies have done on knowledge, attitude and practice of Dengue. However, gaps still exist where even with high knowledge, attitude and practice within the community; dengue fever still remains to be a problem and is currently on the increasing trend. Hence an attempt to better understands health-related behavior and the determinants of adherence to health interventions, a number of theoretical models have been proposed. The Health Belief Model (HBM) is one of the most widely used social cognition models to study and promote the uptake of health services and predict health behavior (Rosenstock, Strecher & Becker, 1988). Although it was originally developed in the 1950s to explain the low participation in medical screening programs, today it is used for a broad spectrum of health-related behaviours. Therefore in order to mitigate the occurrence of dengue infection and the consequences that it may bring to the community this study was conducted to determine the perception on dengue and dengue prevention program among adult residents aged 18 years old and above in a rural settlement in Jempol, Negeri Sembilan.

2.0 Methodology:

This was a cross sectional study done in a rural settlement between March to April 2014. A sample size of 316 respondents was calculated and residents were chosen based on cluster sampling on houses with exclusion of those residents who refused to participate, resident who were diagnosed as mentally challenged patient and of foreign nationality.

2.1 Study area

The rural settlement chosen is situated in Jempol district which is the largest district in Negeri Sembilan. Jempol is a rural district of about 138,569 hectares with occupancy rate of 20.8% and the settlement occupies 57% of its land area. The distribution of land usage is as follows; 80.6% for agriculture activities, 7.1% are reserved forest, 7% forhousing area and 5.3% of wasteland. Population has changed recently where in 1991; statistics of residents in Jempol was 120,447 whereas in 2010, the number of residents has reduced to 116,000.

2.2 Questionnaire

The questionnaire was divided into 3 section; A, B and C. Section A covers the sociodemigraphic characteristic consisting of data for age, sex, race, duration of residency. Section B consist of knowledge on dengue with the aimed at ascertaining the participant understands on the cause, symptoms of dengue and breeding places of Aedes mosquitoes. Section C was devoted to determine the perception of dengue and dengue prevention and control programs was developed based un the Health Belief Model (HBM) which covers six concepts that are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to act and self-efficacy. For the purpose of scoring a Likert scale of 1 to 5 was given to each perception, varying from very disagree, disagree, indifferent, agree, to very agree. There were 7 questions on perceived susceptibility, 6 questions on perceived severity, 5 questions on perceived benefits, 8 questions on perceived barriers, 3 questions on cue to act and 4 questions on self-efficacy. The overall reliability of the questionnaire was acceptable with Cronbach alpha value of .66 to .73. Statistical Package of Social Science (SPSS) Version 21 was used to analyze the data.

3.0 Result and Discussion

3.1 Socio demographic characteristic

Out of the calculated sample size of 316 respondents, 306 residents agreed to participate, giving a response rate of 96.8%. Approximately half of the respondents' was female (57.2%), aged more than 50 years old (47.7%), had attained education up to secondary school (54.9%) and have lived in the settlement for 20 to 30 years (55.9%). Almost all the respondents were of Malay ethnicity and earn an income of less than RM2000 per month (92.2%) as shown in Table 1. These findings showed that rural settlement is now facing an issue of aging settlement as most of the younger generation are no longer interested in the agricultural sector and hence moved on to live in the city for the so called better life. At the same, this type of settlement is in the process of replanting its rubber and palm oil tree and therefore has to some extents affected the lucrative income the residents used to have before.

Table 1: Socio demographic distribution of the respondents (N=306)

Variables	Number (n)	Percentage (%)
Gender		
▪ Male	131	42.8
▪ Female	175	57.2
Age		
▪ <30	79	25.8
▪ 30-50	81	26.5
▪ >50	146	47.7
Ethnicity		
▪ Malay	304	99.3
▪ Non malay	2	0.7
Marital status		
▪ Single	60	19.6
▪ Married	235	76.8
▪ Divorce	11	3.6
Education level		
▪ None	21	6.9
▪ Primary	83	27.1
▪ Secondary	168	54.9
▪ Tertiary	34	11.1
Years of living		
▪ <10	46	15.0
▪ 11-20	41	13.4
▪ 21-30	171	55.9
▪ 31-40	48	15.7
Income (RM per month)		
▪ <1000	209	68.3
▪ 1000-2000	73	23.9
▪ >2000	24	7.8

Table 2 represent the previous personal history of dengue infection among respondents themselves and their immediate family members living in the same house, 25 residents and 62 of their family members have claimed that they had dengue infection (8.2% and 20.3% respectively).

Table 2: Previous history of Dengue Infection among respondents (N=306)

Variable	Frequency (n)	Percentage (%)
▪ *Self*		
– Yes	25	8.2
– No	281	91.8
▪ *Family members*		
– Yes	62	20.3
– No	244	79.7

3.2 *Knowledge on Dengue*

As for respondents' knowledge on Dengue (Table 3), majority of them (91.5%) knew that dengue fever is caused by *Aedes* mosquito. For knowledge on dengue symptoms, fever, body ache and shivering were most frequently mentioned as dengue symptoms, by 93.5%, 85.3% and 83% respectively. The least mentioned dengue symptom was nausea and vomiting which was 74.2%. The result was similar to a study conducted by Abdo Radman, Ganasegeran, Alwan, Ahmed Alshagga & Riyadh (2013) which recorded 97.7% of respondents knew that dengue fever is a vector borne disease, caused by Aedes mosquito while 95% of their respondents agreed that chills and high fever, intense headache, muscle and joint pains are the most common presentation of dengue fever. In addition, two-third of respondent knew that nausea/vommiting and body ache were related to dengue while on the contrary, a study conducted by Taksande & Lakhkar (2012) reported that out of their 410 respondents, only 8.04% and 0.97% of them knew that muscular pain and nausea/vomiting are the symptoms of dengue fever. Thus, it was considered that the rural residents had good knowledge regarding dengue symptoms.

The other question about knowledge regarding dengue fever is mosquito breeding site. In this study, the most common mosquito breeding site chosen was stagnant water (98%), followed by drains (83.7%), garbage (with empty container) (77.5%), and clean water(54.9%), whereas the least common mosquito breeding site chosen was potted plants (43.8%). The selection of stagnant water as a mosquito breeding site is consistent with a KAP study conducted by Hairi et al., (2003) in Kuala Kangsar district, which revealed that 88.5% of their respondents knew that stagnant water was a mosquito's breeding site. Similarly, a study also found that 93% of the respondents knew that stagnant water is the main source for mosquito breeding (Abdo Radman et al., 2013). For other breeding site besides stagnant water, our study has recorded a better knowledge compared to other study. Study conducted by Van Benthem et al. (2002) revealed that 68% of the respondents recognized house drains as a mosquito breeding site and only 36% of them knew that flower pots/plants is one of the mosquito breeding sites. Taksande & Lakhkar (2012) also found that only 5.85% of the respondents agreed garbage/trash as a mosquito breeding site. Hence, knowledge of the rural residents about mosquito breeding site was good as compared to other study, but the recognition of clean water and potted plants as potential mosquito breeding sites has to be rectified.

Table 3: Correct knowledge on Dengue among respondents (N=306)

Variable	Frequency (n)	Percentage (%)
Dengue is caused by *Aedes* mosquito	291	91.5
In your opinion, what are the symptoms caused by dengue?		
• Fever	286	93.5
• Shivering	254	83.0
• Nausea and vomiting	227	74.2
• Body ache	261	85.3
Mosquito breeding site		
• Stagnant water	300	98.0
• Clean water	168	54.9
• Garbage (empty container)	237	77.5
• Drains	256	83.7
• Potted plant	134	43.8

3.3 *Perception on Dengue and Dengue Prevention Program*

Discussion on the perception on dengue and Dengue Prevention Program was based on the 6 concepts of HBM that are perceived susceptibility, perceived severity, perceived benefits that are shown in Table 4(a) while perceived barriers, cue to act and self-efficacy is elaborated in Table 4(b) as below.

3.3.1 *Perceived Susceptibility*

Perceived susceptibility is defined as one's opinion of chances of getting a condition. Table 4(a) shows that despite mass knowledge that the government had given to community, less than half of respondents (47.0%) agree that *Aedes* mosquitoes do not bite in the day time and 19.6% of them was not sure of the biting time. Approximately half of the respondents answered agree to questions such as that if they do not feel the bite (53.3%) or they are bitten regularly by mosquitoes (61.1%) and having a health body (56.5%), they perceived themselves as having low risk for dengue infection. In addition, two third of respondents perceived dengue as a seasonal disease which probably enhanced further their low perceived susceptibility towards dengue. This study was similar with a study based on focused group discussion among 84 Malaysian citizens that found in general, the low perceived susceptibility emerged as two themes, namely a perceived natural ability to withstand infection and a low risk of being in contact with the dengue virus vector, *Aedes spp.* mosquitoes (Wong & Abu Bakar, 2013).

Table 4(a): Respondents results on perceived susceptibility, perceived severity and perceived benefits on dengue and dengue prevention program

No.	Variable	Disagree n (%)	Not sure n (%)	Agree n (%)
	Perceived Susceptibility			
1.	*Aedes* mosquitoes do not bite in the daytime.	102 (33.4)	60 (19.6)	144 (47.0)
2.	I have the chance to get dengue fever.	105 (34.3)	83 (27.1)	118 (38.6)
3.	Dengue is caused by one's misfortune.	198 (64.7)	44 (14.4)	64 (20.9)
4.	If I do not feel the bite of mosquitoes, I'm not at risk for dengue fever.	96 (31.4)	47 (15.4)	163 (53.3)
5.	If someone has a healthy body, the dengue virus will not cause the person to have dengue fever.	86 (28.1)	47 (15.4)	173 (56.5)
6.	Dengue fever is a seasonal disease, I just have to wait for the season to past and I will be safe from dengue.	54 (17.7)	34 (11.1)	218 (71.2)
7.	I am bitten by mosquitoes every day, but I am not infected with dengue fever. So I think that I am not at risk of getting dengue fever.	70 (22.8)	49 (16.0)	187 (61.1)
	Perceived Severity			
1.	Dengue fever can cause death.	9 (3.0)	10 (3.3)	287 (93.7)
2.	Dengue fever can occur without a rash.	64 (20.9)	67 (21.9)	175 (57.2)
3.	Fever for 3 days is worrisome to me. I feel that I do not need to wait up to 5 days to get treatment.	34 (11.1)	20 (6.5)	252 (82.4)
4.	There is a chance that I and the people i know to be infected with dengue fever or dengue hemorrhagic fever.	61 (19.9)	51 (16.7)	194 (63.4)

5.	Although the government provides medical facilities to treat me, I'm still afraid of dengue fever.	22 (7.2)	25 (8.2)	259 (84.6)
6.	I have a lot of acquaintance who have recovered from dengue fever, but I'm still afraid of dengue.	27 (8.8)	50 (16.3)	229 (74.9)
	Perceived Benefits			
1.	Fogging (fumigation) of the house is necessary to prevent dengue	21 (6.9)	21 (6.9)	264 (86.2)
2.	I need to be involved in every health campaign organized by the ministry of health, as it helps reduce the risk of dengue to my family.	13 (4.2)	23 (7.5)	270 (88.2)
3.	With at least one person who is knowledgeable about the disease in the house, he/she can help prevent the disease in the home.	27 (8.8)	29 (9.5)	250 (81.7)
4.	All the time and money I spent to stop dengue is worthwhile because I'm concerned about living a healthier lifestyle.	27 (8.9)	35 (11.4)	244 (79.7)
5.	I prefer to use complementary / traditional treatment	36 (11.7)	55 (18.0)	215 (70.3)

3.3.2 *Perceived Severity*

As for perceived severity it may not be easy for people to prioritize dengue among other acute health and environmental concerns. However this study showed that more than two thirds of respondents had agreed that dengue is a serious condition and the consequences of its infection [Table 4(a)]. This findings may have been affected by the fact that respondents knew some of the residents who were previously hospitalized due to dengue fever, and since the country is experiencing an increament in the incidence of dengue infection, it serve to motivate community action, though often too late to intervene in the trajectory of the outbreak.

3.3.3 *Perceived Benefits*

Perceived benefits has been defined as one's belief in the efficacy of the advised action to reduce risk or seriousness of impact. This study found that more than 80% of respondents perceived that fogging actitivities and involving in an organised health campaign helps to reduce dengue for them. Previous study has highlighted that community-based programs have often been viewed as an economical alternative to government intervention The likelihood of success in dengue prevention can be further enhanced if communities and government agencies are engaged in the effort collectively (Spiegel et al., 2005).

3.3.4 *Perceived Barriers*

Based on Table 4(b), despite perceiving that fogging activity is beneficial for dengue control, there are still one third of respondents (39.5%) that felt thermal and ULV fogging is harmful to health. In addition they felt that the timing of the fogging activities was inconvenient to them and this finding was similar to previous study that found fogging was not well accepted by the community for various reasons such as unsuitable timing of fogging (in the evening) as it coincided with prayer or meal time. Thus this lead to refusal of entry to homes for inspection by enforcement officer as they think the enforcement procedures are very lengthy and cumbersome (Zawaha, Siti Sa'adiah, Sulaiman, Suraya, & Mohd Nasir, 2010). Hence it revealed that the identification of barriers prevailed over the benefits of mosquito control practices in the communities, which may affect the success of the control and prevention strategies adopted by the country.

3.3.5 *Self-efficacy*

Self-efficacy is defined as confidence in one's ability to take action. Surprisingly, despite having correct knowledge on dengue, 21.2% and 37.6% of respondents disagree that they have sufficient knowledge or not sure on the knowledge they have respectively [Table 4(b)]. In addition, 67.3% of the respondent perceived that prevention of dengue fever should be handled totally by the government authorities. These findings was supported by a study done in two communities in Trinidad and Tobago where respondents also perceived the problem of increased in mosquito population as a government problem and not a household problem and hence despite the high awareness and presence of knowledge of dengue fever and *Aedes aegypti* in both communities, the knowledge was found not to link with any significant behavior change (Smith, 2012).

Table 4(b): Respondents results on perceived barriers, self-efficacy and cues to act on dengue and dengue prevention program

No.	Variable	Disagree n (%)	Not sure n (%)	Agree n (%)
	Perceived Barriers			
1.	Thermal fogging (fumigation) and smoke ULV (fogging from vehicle) is harmful to health.	127 (41.5)	58 (19.0)	121 (39.5)
2.	Abate in the water can be bad for health.	153 (50.0)	79 (25.8)	74 (24.2)
3.	What the government does do not help in the fight against the epidemic.	209 (68.3)	44 (14.4)	53 (17.3)
4.	I need a lot of money to implement dengue prevention at home.	224 (73.2)	52 (17.0)	30 (9.8)
5.	I am very busy until I have no time to implement dengue prevention at home.	225 (73.5)	54 (17.6)	27 (8.8)
6.	I or my family feels that fogging (fumigation) is dangerous and can stain the house and therefore during fogging activity, I do not like to open the doors and windows.	182 (59.5)	41 (13.4)	83 (27.1)
7.	Afternoon / evening session is the time for prayer and meals. Hence if fogging (fumigation) is being carried out at that particular time, I find it very inconvenient when they order me/family to leave the house.	172 (56.2)	46 (15.0)	88 (28.8)
8.	I have other reasons for not cooperating with implemented dengue prevention activities.	231 (75.5)	53 (17.3)	22 (7.2)
	Self-Efficacy:			
1.	Do you think what you do is important to reduce the incidence of dengue fever?	18 (5.9)	39 (12.7)	249 (81.4)
2.	Do you have sufficient knowledge about dengue fever?	65 (21.2)	115 (37.6)	126 (41.2)
3.	Do you think what you do is right to prevent dengue?	19 (6.2)	66 (21.6)	221 (72.2)
4.	Prevention of dengue fever should be handled totally by the government authorities.	69 (22.6)	42 (13.7)	195 (63.7)
	Cues to Act			
1.	I have a lot of resources that have led me to prevent dengue.	36 (11.8)	83 (27.1)	187 (61.1)
2.	I received encouragement to pursue the prevention of dengue fever at least once a week.	13 (4.2)	55 (18.0)	238 (77.8)
3.	My friends / family /the people in my area are very inclined toward the prevention of dengue fever.	42 (13.7)	68 (22.2)	196 (64.1)

3.3.6 *Cues to Act*

Strategies to activate one's readiness to act is also crucial in achieving the goal for any communicable diseases prevention and control program. This study reveals that only 61.1% of respondent thought that they have resources for preventing dengue while 64.1% perceived that their friends, family or the people in their area are very inclined toward the prevention of dengue fever. This shows that community participation toward dengue is not comprehensive and one might asked how far has the government health promotion activities in terms of information on guidance/training on dengue prevention and control has reached the community. Therefore, prevention and control program should be constructed in means and ways to heighten awareness or trigger interest among respondents in performing the health related activity to prevent, control or treat the specific health related problem.

4.0 Conclusion and recommendation:

This study has highlighted that having good knowldge alone is not sufficient for dengue control while perception towards barrier, self-efficacy and cues to act among respondents can be further stregthened. As dengue is related to health behaviour concept, the present prevention and control program can be design through the HBM six components to encourage community to make decisions and behavior change for dengue and dengue prevention effectively.

Ethical

This study was approved by the Ethics Committee for Research involving Human Subjects (JKEUPM), Universiti Putra Malaysia [UPM/TNCPI/RMC/1.4.18.1 (JKEUPM)/F2. Written informed consent was obtained from each respondent voluntarily and confidentiality of the collected data was maintained throughout the study period.

Declaration of conflict of interest

I/we author(s) of the article declare that there is no conflict of interest regarding publication of this article.

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