

Original Article

KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING THE PREVENTION OF DENGUE AMONG THE COMMUNITY IN KOTA SETAR DISTRICT

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ABSTRACT

Dengue or dengue fever, which is a vector borne disease, is one of the most important public health issues in Malaysia, that possesses high morbidity and mortality. Based on national data, a cyclical pattern with a dengue epidemic every four to five years is a recognized trend in Malaysia and is anticipated by the end of the year due to the monsoon season subsequently leading to favourable conditions for mosquitoes breeding. Several hotspots of dengue areas have been identified while there are also areas with active cases that are being observed with an increasing trend. The alarming trend in Kedah with an increase of 356.5% from the period of January to 13 May 2023, last year compared to that of previous year signifies a nerve-wracking state. Presently, Kota Setar district in Kedah has been on edge and concerned with regards to the rise of dengue cases according to the Kota Setar Health District Office. Prevention of dengue remains the best solution as a consequence of no specific medicine and its self-limited illness nature. Thus, this study aims to assess the knowledge, attitude and practice towards dengue prevention among the Kota Setar population. A total of 257 respondents were evaluated for their knowledge, attitude and practice regarding dengue prevention. The results indicate that the Kota Setar population has an adequate knowledge with good and moderate levels, while a poor attitude and unsatisfactory level of practice towards dengue prevention. In conclusion, the research conducted in Kota Setar demonstrated an inadequate degree of community perspectives towards dengue prevention and actions despite personal preventive initiatives or vector control measures.

INTRODUCTION

Dengue fever or also known as break-bone fever is a viral ailment transmitted by mosquitoes to humans. It is more prevalent in tropical and subtropical settings. Malaysia is one of the countries that has tropical climates. Dengue fever is caused by dengue virus, a member of the genus Flavivirus of the family Flaviviridae, is an arthropod-borne virus that includes four different serotypes (DEN-1, DEN-2, DEN-3, and DEN-4(1,2). Dengue virus infection presents a diverse clinical picture that ranges from asymptomatic illness to the severe illness of dengue hemorrhagic fever/dengue shock syndrome.

Female *Aedes aegypti* and *Aedes albopictus* mosquitoes are the primary and secondary vectors in Malaysia respectively. Evidently, dengue is the most rapidly spreading arboviral disease in the world.

The *Aedes* mosquitoes have 4 life stages: egg, larva, pupa and adult. Mosquitoes can live and reproduce inside and outside the home. The entire life cycle, from an egg to an adult, takes approximately 8-10 days [3].

Dengue has been much more commonplace worldwide in the last several decades; from 505,430

cases in 2000 to 5.2 million cases in 2019, instances have been reported to the World Health Organisation. The vast majority of dengue cases are mild or asymptomatic, and they are typically self-managed, therefore the true number of cases is likely underestimated. Additionally, a lot of instances are mislabeled as other feverish conditions [4]

A cross-sectional study by Sivanawari et al has been conducted regarding the KAP on dengue prevention and dengue seroprevalence in a dengue hotspot in Malaysia. From the study, it shows that more than half of total participants (474 respondents) have good knowledge (50.7%), poor attitude (53.2%) and also poor practice regarding the dengue control (50.2%). This study also showed that there is significant positive correlation between knowledge-attitude, knowledge-practice and attitude-practice [5] 2019 recorded as the highest number of dengue cases worldwide. In Asia, Bangladesh (101 000), Malaysia (131 000), the Philippines (420 000), and Vietnam (320 000) all reported a high number of cases [3].

Since 2014, Malaysia has consistently recorded over 100,000 dengue cases annually, with the highest number reported in 2015 at 120,836 cases, over 50% of which originated from Selangor state. In subsequent years, a decline was observed, with 101,357 cases in 2016 and 83,849 cases in 2017. By June 2018, 25,949 cases had been reported for that year. Between 1995 and 2017, nearly 2,500 fatalities were attributed to dengue, with the highest annual death toll of 336 recorded in 2015. From 2017 to June 2018, 44 deaths were reported.

The World Health Organization (WHO) highlighted a significant resurgence in 2019, with a total case count from 1 January to 2 March being 157% higher than the same period in 2018. By the end of July 2019, 79,151 dengue cases were reported nationwide, with Selangor again accounting for over 50% of the cases.

Starting in 2022 Dengue cases increased significantly from 48,109 cases recorded in 2022 to 96,443 cases accumulated as of October 2023, a 100.5 percent rise. About 64,078 cases of dengue fever were reported countrywide in Malaysia in 2022; there were 26,365 cases in 2021 and 90,304 cases in 2020. In terms of mortality, by October 22, 2023, 73 deaths from dengue-related complications had been reported, up from 29 deaths in the same time in 2022. Average daily cases exceeded 300 in October 2023 [6].

As immunisation is still not a practical option and there is now no specific therapy for the disease, vector management and surveillance remain the

cornerstones of dengue prevention initiatives. Local initiatives like Malaysia's Communications for Behavioral Changes (COMBI) have demonstrated their potential to lower dengue morbidity, but community comprehension is also necessary [7].

Additionally, community support, collaboration, and participation are needed for vector control techniques such larval surveys, fogging, ULV sprays, and regulations like the Destruction of Disease Bearing Insects (Amendment) Act 2000. Thus, for successful vector management, awareness of the baseline knowledge, attitudes, and practices (KAP) of dengue in the community is crucial. Dengue prevention requires equal emphasis on health education. Therefore, it is crucial to provide basic information about dengue and its preventive measures in addition to assessing the community's awareness of the disease dengue morbidity, but community comprehension is also necessary [7].

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A study was conducted to assess the level of knowledge, attitude and practice towards dengue prevention among the community in Kota Setar, Kedah, Malaysia.

METHODOLOGY

A cross-sectional study was performed in the Kota Setar community. The participant was selected through convenience sampling in which they are easy to reach, rapid and convenient in terms of time and place to answer the questionnaire. This study gathered data from 257 respondents. The research was carried out between December 14th, 2023 and January 16th, 2024.

The questionnaire was initiated with an invitation message, followed by a consent agreement for participation. The questionnaire can be divided into four sections: Section A involves social demographics; Section B determines the community's knowledge of dengue prevention;

Section C investigates the residents' attitudes toward dengue prevention; and Section D determines the dengue prevention practices of Kota Setar residents. Data was collected online using Google Form as it was easy to collect and analyze. It was distributed to the respondents through social media platforms such as Telegram, Whatsapps, Facebook and Instagram.

SPSS Version 27 was utilised to analyse data. Measurement of knowledge, attitude and practices of dengue prevention among the Kota Setar population was categorized based on the score. For 11 items of knowledge questions and 6 items of attitude questions, each respondent who answered "Strongly disagree, disagree or not sure" was given "0" as a score and who answered "Strongly agree" was given "2" as a maximum score. Another 4 items of attitude questions, each respondent who answered "Not very

important or not important or not sure" was given "0" as a score and who answered "Very important" was given "2" as a maximum score. For the first 5 items of practice questions, each respondent who answered "Never, sometimes, etc." was given a score of "0" and who answered "Often, always, etc." was given "1" as a maximum score. Another 6 items of practice questions, each respondent who answered "never" was given a "0" score and who answered "always" was given a score of "4". The method of scoring is illustrated in Table 1.

The assessment of categorical levels of knowledge, attitude and practices towards dengue prevention is determined through the multiplication of the total number of questions and the maximum score obtained for each response then followed the Bloom's cut-off point, as illustrated in Table 2.

Table 1: Scoring method for each question in knowledge, attitude and practice parts.

Score	Knowledge Question No. 1 – 11 (K1, K2, K3, K4, K5, K6, K7, K8, K9, K10, K11) and Attitude Question No. 1 – 3, 7, 9, 10 (A1, A2, A3, A7, A9, A10)
0	Strongly disagree/ Disagree/ Not sure
1	Agree
2	Strongly agree
Score	Attitude Question No. 4 – 6, 8 (A4, A5, A6, A8)
0	Not very important/ Not important/ Not sure
1	Important
2	Very important
Score	Practice Question No. 1 – 5 (P1, P2, P3, P4, P5)
0	Never/ Rarely/ Sometimes/ Monthly/ Fortnightly
1	Often/ Always/ Weekly/ Everyday
Score	Practice Question No. 6 – 11 (P6, P7, P8, P9, P10, P11)
0	Never
1	Rarely
2	Sometimes
3	Often
4	Always

Table 2: Bloom's cut-off categories of knowledge, attitude and practice scores.

	Level	Percentage	Score	Category
Knowledge (11 Questions × 2 marks = 22 marks)	Good	80 – 100%	18 – 22	3
	Moderate	60 – 79%	13 – 17	2
	Poor	<60%	0 – 12	1
Attitude (10 Questions × 2 marks = 20 marks)	Good	80 – 100%	16 – 20	3
	Moderate	60 – 79%	12 – 15	2
	Poor	<60%	0 – 11	1
Practice (5 Questions × 1 mark + 6 Questions × 4 marks = 29 marks)	Satisfactory	80 – 100%	23 – 29	3
	Fairly satisfactory	60 – 79%	18 – 22	2
	Unsatisfactory	<60%	0 – 17	1

RESULTS

Most of the respondents are Malays (216, 84.0%), middle age population (110, 42.8%), males (155, 60.3%), bachelor degree holders (153, 59.5%), students (82, 31.9%), marrieds (160, 62.3%), urban (179, 69.6%) and M40 population (110, 42.8%).

Frequency and percentages of each category in the knowledge, attitude and practice as shown in Table 3 demonstrated that almost an equal number of Kota Setar population achieved between the summation of both good (34, 13.2%) and moderate (100, 38.9%) knowledge compared to poor knowledge (123, 47.9%). While attitude and practice predominantly are poor (177, 68.9%) and unsatisfactory (213, 82.9%), respectively. Minority achieved a good (60, 23.3%) and moderate (20, 7.8%) attitude. Only a small number of respondents i.e., 12 subjects (4.7%) with satisfactory level of practice and another 32 subjects (12.5%) at fairly satisfactory level.

Knowledge

Based on the One-way ANOVA, there are significant difference in knowledge between groups of each independent variables i.e., ethnicity, age, gender, educational level, occupation, marital status, settlement area and monthly income. Based on the Chi-Square test, there are significant associations between level of knowledge and all independent variables i.e., ethnicity, age, gender, educational level, occupation, marital status, settlement area and monthly income.

To be concluded with regards to the level of knowledge, poor knowledge is observed in Malays (66.7%), middle age population (79.7%), males (78.9%), bachelor degree holders (55.3%), self-

employed workers (36.6%), marrieds (84.6%), urban population (88.6%) and M40 population (46.3%). While good knowledge can be seen in Malays (100%), young adults (70.6%), females (61.8%), bachelor degree holders (91.2%), students (61.8%), singles (70.6%), both urban and rural population (50.0%) and no income population (44.1%).

Attitude

Based on the One-way ANOVA test, there are significant difference in attitude between groups of other independent variables i.e., ethnicity, age, gender, educational level, occupation, marital status and monthly income. Based on the Chi-Square test, there are significant associations between level of attitude and all independent variables i.e., ethnicity, age, gender, educational level, occupation, marital status, settlement area and monthly income.

To be concluded with regards to the level of attitude, poor attitude is observed in Malays (77.4%), middle age population (52.0%), males (72.9%), diploma/ foundation/ matriculation holders (76.9%), government sector workers (27.7%), marrieds (75.7%), urban population (73.4%) and M40 population (50.8%). While good attitude can be seen in Malays (98.3%), young adults (61.7%), females (65.0%), bachelor degree holders (83.3%), students (53.3%), singles (70.0%), urban population (56.7%) and no income population (38.3%).

Practice

Based on the One-way ANOVA test, there are significant difference in practice between groups of other independent variables i.e., ethnicity, gender, occupation, marital status, settlement area and

Table 3: Frequency and percentage for the categories of knowledge, attitude and practice.

	Level	Percentage	Score	Category	Frequency
Knowledge	Good	80 – 100%	18 – 22	3	34 (13.2%)
	Moderate	60 – 79%	13 – 17	2	100 (38.9%)
	Poor	<60%	0 – 12	1	123 (47.9%)
Total					257 (100%)
Attitude	Good	80 – 100%	16 – 20	3	60 (23.3%)
	Moderate	60 – 79%	12 – 15	2	20 (7.8%)
	Poor	<60%	0 – 11	1	177 (68.9%)
Total					257 (100%)
Practice	Satisfactory	80 – 100%	23 – 29	3	12 (4.7%)
	Fairly satisfactory	60 – 79%	18 – 22	2	32 (12.5%)
	Unsatisfactory	<60%	0 – 17	1	213 (82.9%)
Total					257 (100%)

monthly income. Based on the Chi-Square test, there are significant associations between level of practice and other independent variables i.e., ethnicity, gender, educational level, occupation, marital status, settlement area and monthly income.

To be concluded with regards to the level of practice, unsatisfactory level of practice is observed in Malays (81.2%), males (66.7%), bachelor degree holders (56.8%), students (29.1%), marrieds (67.1%), urban population (72.8%) and M40 population (45.1%). While satisfactory level of practice can be seen in Malays (100%), females (66.7%), bachelor degree holders (91.7%), both students and government sector workers (41.7%), singles (58.3%), rural population (66.7%) and M40 population (50.0%).

An extra question regarding satisfaction level towards current government and community efforts have been recorded in frequency and percentage values. The responses among the Kota Setar population revealed that 104 respondents (40.5%) are very satisfied, majority by 133 respondents (51.8%) are satisfied, while 13 (5.1%) are not sure and minority by 7 respondents (2.7%) are unsatisfied

DISCUSSIONS

When it comes to human morbidity and mortality, dengue is one of the most significant arthropod-borne viral illnesses. Dengue has grown to be a

significant public health issue. It primarily affects urban and semi-urban areas in tropical and subtropical regions of the world including Malaysia. It is important to assess the level of knowledge, attitude and practice towards dengue prevention in order to know if the health education and promotion efforts by the Ministry of Health reach the public effectively and to actively put this into action.

In this study, a total of 257 participants responded to the questionnaires. Bearing in mind, most of the participants who responded are Malay (84%) which is then followed by other ethnicities thus, the study is unable to represent as a whole the level of knowledge, attitude and practice of communities in Kota Setar.

The study reveals that the majority of the respondents know that dengue can be prevented (42%). More than half (60.3%) of the respondents agree that female mosquitoes are the culprit of dengue. This is due to the fact that almost all health education programmes focus on spreading facts regarding the Aedes vector. To the question asked regarding aedes mosquito eggs survival in a dry condition up to 6 months, a surprising majority of the respondents (60.7%) strongly disagree, disagree or were not sure. This could be due to lack of awareness and inadequate educational approach to the community. Many people had a solid knowledge of Aedes biting behaviours, and they were aware that the best times to bite were during dawn and

dusk (79%). This information is crucial because the majority of preventative measures, such as bed netting and mosquito coils, are typically utilized at night and this is ineffective against *Aedes* mosquito bites. The prevalence of respondents agree and strongly agree that mosquito breeding can be prevented by fish farming and placing insecticides into a water tank are 80.9% and 65.4% respectively. Even though the majority of them know that fogging periodically can prevent dengue, there is a small number of people (1.9%) who refuse to believe that similar to results reported by Kamel et al. (2017). Surprisingly, more than half (52.1%), are unaware that mosquitoes can be killed by using a spray containing DEET, picaridin and aerosol. This is probably due to lack of educational message or promotion regarding the use of the sprays. There are mixed reactions toward the question of whether mosquito bites can be prevented by wearing fully covered clothing as 30.4% of the respondents strongly agree with the statement, 47.9% of them agree with the statement, and 21.8% of them either strongly disagree, disagree or unsure of this.

Concerning the attitude towards dengue prevention, most of the respondents appeared to have a poor attitude as masses. However, it is noteworthy that there is bias in this study thus it is unfair to say that everyone has a poor attitude towards dengue prevention. It is consoling to know that many of the respondents believe responsibility towards dengue prevention lies on each individual and mutual cooperation in cleaning residential areas is compulsory in dengue prevention. This shows how health education and promotion are capable of instilling responsibility among the community in order to eradicate dengue. However, every rose has its thorn as there are few respondents who refuse to accept that everyone plays a role in dengue prevention. They do not realize it is important to unite with the same intention of preventing dengue. Similar to studies conducted by Chng et al. (2022), where not all respondents fully agree that it was their responsibility to keep their place free from mosquito breeding sites [8].

Practice of dengue prevention appeared to be unsatisfactory. Despite knowing that putting insecticides into a water tank can prevent mosquito breeding, most of the respondents still did not practice that. Therefore, the discrepancy between knowledge and practice proved that having good knowledge does not equate to having good practice. On the other hand, respondents were asked how frequently they monitor and clean up their surrounding house area and only a minority (19.5%) would do that often, weekly or every day. The rest were either never, rarely, sometimes, monthly or fortnightly only. However, the majority would empty

any stagnant water from the containers frequently. This shows that with regards to practice, the respondents showed good practice concerning eliminating stagnant water but were lacking in the aspect of inspecting their houses. Most of the respondents (47.1%) never avoid themselves from being outside the house in the morning and dusk. This may be due to the type of occupation of the respondents. Based on the results of this study, there is an association between level of practice and occupation. Students showed an unsatisfactory level of practice while government sector workers showed satisfactory levels. Students probably lack awareness or they have activities that require them to spend more time outside at those times of *Aedes* biting.

From the KAP study, it was found that the summation of good (13.2%) and moderate (38.9%) level of knowledge are almost equal to poor knowledge (47.9%). As discussed early, the majority strongly disagree, disagree or are unsure that mosquitoes can be killed by using a spray containing DEET, picaridin and aerosol. Besides, they are also unaware about the survival rate of *Aedes* mosquito eggs in a dry condition. Thus, this may indicate less knowledge regarding dengue prevention. Other studies showed that the majority (87.8%) of their respondents had adequate knowledge of cause, transmission, treatment and prevention of dengue. Furthermore, it was observed from this study that the majority of our subjects expressed poor attitude and unsatisfactory practices respectively. This should be a big concern as having good practice plays a vital role in mitigating dengue cases in our country. This contrasts with a study conducted by Oche OM, 2021 where it showed positive attitude and appropriate practice among the subjects [7].

Based on the result of this study, there is association between level of knowledge and all independent variables i.e., ethnicity, age, gender, educational level, occupation, marital status, settlement area and monthly income. This showed that there are many factors contributing to the level of knowledge regarding dengue prevention among the Kota Setar population. Parallel with KAP study done by Zaki et al. 2019 which showed good knowledge of Petaling District citizens on dengue prevention with a percentage of 64.1% [9].

The result of this study revealed that the practice on dengue prevention among the Kota Setar population is associated with educational level. Those with Bachelor degrees seem to have satisfactory practice towards dengue prevention. In fact, the higher the educational level is the more knowledge and insight they obtain in regards to dengue

prevention. It is plausible that they would be better able to identify dengue causes, prevention and treatment and therefore faster action can be taken in order to prevent it.

There was a weak association between knowledge and practice. This showed that dengue control practices are not necessarily influenced by level of knowledge. As in the 1986 KAP study, it is also thought that most knowledge originating from the mass media is ineffective in discouraging deeply ingrained habits (like storage of water) and encouraging distasteful habits (like adding chemicals to drinking water) [10]. For knowledge and attitude, there is moderate positive association. According to Rosenstock's Health Belief Model 1974, people's health beliefs depend upon their perception of susceptibility to disease [11]. Majority of them know that dengue can be prevented and are willing to help reduce the number of dengue cases in their own areas. Similarly, there is moderate positive association between attitude and practice. The connection between people's attitudes and practices is well established in psychology, explained through the Theory of Planned Behaviour. In this study, people who believe the importance of opening doors and windows during fogging will usually give full cooperation to fogging activities [8].

STUDY LIMITATION AND RECOMMENDATIONS

Despite achieving its objectives, this study had many inevitable limitations. The first is that there is only a 4-week time constraint. We had 4 weeks to finish the study and conduct every aspect of the research. This is one of our major challenges because we didn't have enough time to explore every topic in depth, and we did not have ample time to get more responses. We solely focused on the locals of Kota Setar for our research. Since the majority of the people who answered the questionnaire worked in one location, such as the PKD and health clinic in Alor Setar, we were unable to cover every location in Kota Setar. Our minimum sample size that we need is 384. However, we only managed to gain 282 respondents, which is a relatively small amount as it only represents small percentages of the total population in Kota Setar. In order to have a more accurate result in terms of precision, a larger sample size and a longer time limit should be given for us to be able to gain more respondents.

The use of social media in this study, including Facebook, WhatsApp, and Telegram, resulted in low randomness. Relationships between users are the basis of most social media platforms. When the questionnaire was distributed, this limited respondents to people who had specific connections

to the researchers. This phenomenon is comparable to the non-probability sampling method known as the snowball sampling technique.

Sampling bias in the process of conducting a systematic study, researchers may unintentionally or purposely affect the outcome. This is referred to as research bias, and it has the same tendency to bias or change the outcomes as other types of bias. Any pattern in the collecting, interpreting, analyzing, publishing, or reviewing of data that may result in findings that are consistently at contrast with reality is referred to as bias [12]. One of the main causes of the lower validity of study findings is research bias.

Despite some of the limitations, a few suggestions are suggested to improve the study for a better result. First and foremost, extending the study period would help us to get more samples and fairly distribute the questionnaire to cover all the residents in Kota Setar. A random probability sampling technique should be used by researchers to ensure that the study is conducted with fairness and randomly. Any effective study needs to be random. A variety of sampling methods, including among them are cluster, random, stratified, and systematic sampling.

Despite many research constraints, the study provided valuable insights and information that would encourage the government to implement dengue preventive measures aimed at reducing the escalating dengue fever epidemic. The media is one of the primary channels for spreading knowledge and awareness about dengue. Thus, more signs and billboards highlighting the severe consequences of the dengue fever should be placed in remote and isolated areas. This will help to deliver information to all of the people despite their sociodemographic status and lead the study to a good result.

CONCLUSION

From this cross-sectional study, 257 respondents had done the questionnaire completely thus helping us to conclude this research. Firstly, the findings indicate the level of knowledge among participants is low and majority of the participants have poor attitude, and unsatisfactory practices regarding dengue prevention. Secondly, there is a significant relationship between the level of knowledge and all independent variables. It also revealed that the practices towards dengue prevention are associated with the level of education while showing that there is weak association between knowledge and practices. Hence, the knowledge of the participants

does not impact the practices if they are not applied in the correct way.

Lastly, despite the majority having good satisfactory levels (very satisfied and satisfied) towards government and community efforts as illustrated in Table 15, the level of KAP is clearly shown as otherwise. These results also emphasize how important it is to educate people about dengue fever because preventing and controlling the disease depend greatly on information, awareness, and good habits. Thus, the government can start to implement more plans to focus more on this matter as the effectiveness of dengue prevention largely depends on the locals.

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