

A Cross Sectional Study on Knowledge, Attitude, Practice of Dengue fever: Methods for Prevention and Control among Students in Bangkok

Kantapatra Kraiarb

phoenixforever14@gmail.com

Department of Science and Mathematics, Kwong Chow School, BangRak 10500 Bangkok, Thailand

Abstract

Dengue fever is spread primarily by mosquitoes. The disease has a considerable significant impact on people, and it has long been a problem in Thailand.

The purpose of this study is to examine Bangkok secondary school students' knowledge, attitudes, practices, and prevention and control regarding dengue fever. Additionally, approaches for disease prevention and control will be suggested.

Data on dengue fever were obtained through an online survey. The questions were divided into five main categories: demographics data, knowledge of the dengue, attitude, practices, and attitude on prevention and control of the dengue's transmission.

This study involved 127 students in total. The findings revealed that most participants had a moderate level of knowledge regarding dengue fever ($M= 4.488$, $SD= 1.154$) and a positive attitude toward the disease ($M= 34.76$, $SD= 4.078$). The majority of participants ($M= 21.52$, $SD= 3.986$) reported a moderate level of attitude toward preventing and controlling dengue fever, and they also implemented moderately effective dengue fever practices ($M= 28.36$, $SD= 6.202$).

The findings revealed that males have far less knowledge and positive attitudes regarding dengue fever than females did. Students aged >18 prefer to take actions on preventing dengue fever. The levels of knowledge, attitudes, practices and prevention and control are strongly associated with age and educational level.

Keywords: Knowledge, Attitudes, Control Practices, Dengue fever, Secondary student

1. Introduction

Dengue fever is a viral infection spread by the female mosquito *Aedes Aegypti* and has four different strains (DENV-1 to DENV-4). Dengue hemorrhagic fever and Dengue Shock Syndrome are two severe dengue fever complications. High fever, bleeding, low platelet counts, and plasma leakage are all indications of dengue hemorrhagic fever, which is caused by low protein and albumin levels in the blood. After 2-7 days of dengue hemorrhagic fever, dengue shock syndrome can develop, accompanied by symptoms of low blood pressure and pulse.

In recent years there has been a significant expansion of this disease, both in terms of geographic distribution and the increase in cases that have been documented globally. Human dengue infections are brought on by the dengue virus (DENV), a member of the Flaviviridae family and of the Flavivirus genus. In 1970, these serotypes were unevenly distributed, but by 2004, verified DENV 1-4 cases had been located all over the world. These mosquitoes prefer the warm climates of tropical and subtropical regions because it helps them grow more quickly. *Aedes* are primarily prevalent in urban and suburban

regions because they have high population densities, more availability containers, and places with stagnant water where they could breed.

Dengue hemorrhagic fever was first documented in Thailand in 1949, and the first dengue outbreak was recorded in 1958, with 2,158 cases and 300 deaths. The country has recently suffered two large epidemics, the first in 1987 with 174,285 cases reported and the second in 1998 with 129,954 cases reported. The virus has been detected in all four serotypes throughout the country, with the majority of cases recorded in children under the age of 14. The main vector in the country is *Aedes aegypti*. The complex interactions between human, mosquito, virus, and environmental factors make it difficult to treat dengue fever. Aside from that, there is no treatment to cure the condition, and the dengue vaccine that is now being used to prevent the sickness is causing a serious difficulty for halting and controlling its spread.

Therefore, the effective dengue prevention strategies right currently involve avoiding *Aedes* mosquito bites and lowering their number. Early symptom diagnosis and subsequent treatment of the appropriate medication can reduce mortality in infected individuals. Finally, a comprehensive monitoring system can provide early warnings and improve dengue management capability through a proactive strategy.

The WHO published global strategy recommendations in 2012 to help nations worldwide lessen the impact of dengue. The WHO has released several publications in addition to these guidelines throughout the course of many decades in an effort to completely eradicate dengue. The 2012 WHO approach has five technical components: diagnostic and case management, integrated surveillance and outbreak readiness, sustainable vector control, future vaccine implementation, and fundamental operational and implementation research. The WHO surveillance recommendations state that a typical case investigation should be carried out 24 hours after the initial case notification. Utilizing epidemiological investigation (EI), which must be carried out within a 100-metre radius of the residence of a confirmed dengue case in order to look for the existence of other persons harboring a suspected dengue illness, this notice is utilized to carry out surveillance activities.

2. Objectives

This study objective goal is to examine secondary school students in Bangkok regarding their knowledge, attitudes, and practices on dengue disease.

3. Research Methodology

A research was conducted on secondary students regarding dengue illness. The information was obtained via a 40-question online questionnaire and the total response was 127. The survey was distributed to all Thai schools in Bangkok between June 9, 2022, to June 26, 2022, in the form of a Google Form. The questions were broken down into four categories: knowledge, attitude, practice, and attitude on prevention and control among students in prevention of dengue.

3.1. Study instruments

For the purpose of this study, a Google Form questionnaire was created. There were five sections in the questionnaire. The first section of the questionnaire consisted of items regarding demographic information, including age, gender, and educational attainment. Questions about dengue fever knowledge and sources of information about dengue fever were included in the second section. Seven questions were used to gauge knowledge of dengue fever. There were questions on dengue fever transmission, associated symptoms, and medical treatments. The questions were multiple choice

questions and checklist options. The third section evaluated attitudes concerning dengue control, particularly general knowledge of dengue infections, their responsibility for preventing and controlling the disease, and public awareness of dengue infections. Ten questions comprised this section, with the choices for answers being "Strongly agree," "Agree," "Disagree," or "Not sure." The fourth section addressed practices on dengue, and the response options were "Always," "Often," "Sometimes," or "Never." in the total of ten questions. It contained items such as using mosquito repellent, disposing of waste, preserving cleanliness in larval habitats, and engaging in community awareness programs. The prevention and control of dengue were the focus of the last section. There are ten questions in the survey, and the respondents are asked to indicate how individuals agree to prevent dengue such as cleaning water tanks, wearing long sleeves, and using insecticides. The answer options were "Agree," "Maybe," or "Disagree."

3.2. Statistical analysis

The IBM SPSS Statistics version 28.0.1.1(15) was used to analyze data in this study. The study included descriptive and bivariate analysis. Questions on knowledge, attitudes, practices and prevention and control were summed, and the total score was obtained. For each knowledge item, a true answer was coded '1' and the false answer was coded '0', and the total scores ranged from 0 to 7. For attitude items, the positive attitude was coded '4' if the answer was "Strongly agree", '3' if the answer was 'Agree', '2' if the answer was 'Not sure' and if the answer was 'Disagree' it was coded as '1', and the total scores ranged from 10 to 40. Practice items were coded '4' if the answer was 'Always', '3' if the answer was 'Often', '2' if the answer was 'Sometimes' and '1' if the answer was 'Never', and the total scores ranged from 10 to 40. The total scores for the prevention and control items varied from 10 to 30. The prevention and control items were coded "3" if the response was "Agree," "2" if the answer was "Maybe," and "1" if the answer was "Disagree."

3.3. Ethical considerations

The objectives and benefits of the study were explained to the participants. It was reassured that information would be confidential and participation was entirely voluntary.

4. Results

This study was conducted among schools in Bangkok. The study involved 127 participants. The demographic information, knowledge, attitude, attitude on prevention and control, and practice regarding dengue fever of the respondents was shown in table 1. The table depicts that the majority of the respondents were female (n=99, 78%) and the rest were male respondents (n= 28, 22%). The majority of respondents fall in the age range of 15-17 (n = 89, 70.1%). The rest of the respondents fall in the range older than 18 (n= 27, 21.3%) and age range 11-14 (n= 11, 8.7%) respectively. Regarding their education level, higher secondary (n= 113,89%) were computed more than lower secondary (n=14, 11%).

In terms of knowledge regarding dengue fever, female respondents (M= 4.576, SD=1.144) scored higher than male respondents (M=4.179, SD= 1.156). The knowledge of dengue fever was least well-known among those aged 15–17 and >18, with mean scores of 4.47 (SD=1.244) and 4.37 (SD=0.8835) respectively. The age group of 11–14 years showed the greatest knowledge on dengue with an average score of 4.91 (SD = 0.944). Participants in lower secondary education had the highest degree of dengue-related knowledge, with a 4.50 (SD=1.09) score, which was higher than that of participants in upper secondary education (M=4.49, SD=34.85).

Female respondents indicated a better level of attitude towards dengue fever than male respondents with the mean scores of 34.94 (SD= 3.88) while for men it was only 34.94 (SD= 3.88). Likewise, the 15-17 age group appears to have the greatest altitude of about 34.798 (SD= 3.820) followed by students older than 18 (M= 34.67, SD= 4.812) and age range of 11-14 with the average score of 34.64 (SD= 4.567). On the education scale for attitudes about dengue fever, higher secondary students typically perform better, scoring a mean score of 34.85 (SD=4.06) compared to lower secondary students (M=34.00, SD=4.28).

Regarding prevention and control on dengue disease, male respondents take the most actions on preventing the disease with an average score of 21.75 (SD= 4.559), while female respondents did 21.75 (SD=3.83). Additionally, students that were older than 18 years old have the most perception on preventative behavior with a score approximately 22.22 (SD= 4.66) compared to students in 15-17 and 11-14 with the mean score of 21.27 (SD=3.735) and 21.82 (SD=4.35) respectively. Lower secondary showed the mean score of 21.93 (SD= 3.605) and higher secondary showed 21.47 (SD= 4.04).

The average value for male practices on dengue fever was 28.536 (SD=6.691), whereas the average value for female practices was 28.31 (SD=6.09). In respect of the age range, students between the ages of 15 and 17 had the lowest mean scores (M=27.899, SD=6.083), followed by students between the ages of 11 and 14, who had mean value of 29.09 (SD=7.50), and those over 18, who had mean value of 29.59, (SD=6.084). Likewise, lower secondary level seems to have a higher score of 29.36 (SD= 7.541) and higher secondary level shows a low practice of dengue (M=28.24, SD= 6.054).

Table 1: Results based on the respondents' sociodemographic characteristics, knowledge, attitude, prevention-control, and practice regarding Dengue fever (n=127)

	n (%)	Knowledge about Dengue fever (M, SD)	Attitude towards Dengue fever Range 10-40 (M, SD)	Attitude toward Prevention and Control on Dengue fever (10-30) (M, SD)	Practices on Dengue fever (10-40) (M, SD)
Gender					
Male	28 (22%)	4.179 (1.156)	34.11 (4.74)	21.75 (4.59)	28.536 (6.691)
Female	99 (78%)	4.576 (1.144)	34.94 (3.88)	21.45 (3.83)	28.31 (6.09)
Age					
11- 14	11 (8.7%)	4.91 (0.944)	34.64 (4.567)	21.82 (4.35)	29.09 (7.50)
15-17	89 (70.1%)	4.47 (1.244)	34.798 (3.820)	21.27 (3.735)	27.899 (6.083)
>18	27 (21.3%)	4.37 (0.883)	34.67 (4.812)	22.22 (4.66)	29.59 (6.084)
Education Level					
Lower Secondary	14 (11%)	4.50 (1.09)	34.00 (4.28)	21.93 (3.605)	29.36 (7.541)
Higher Secondary	113 (89%)	4.49 (1.166)	34.85 (4.06)	21.47 (4.04)	28.24 (6.054)
Total	127 (100%)	4.488 (1.154)	34.76 (4.078)	21.52 (3.986)	28.36 (6.202)

The knowledge of respondents about dengue fever is given in Table 2. The physical characteristics of dengue mosquitoes could be recognized by nearly half of the respondents (n=58, 45.67%). A large majority of participants (n=97, or 76%), could determine the causes of dengue fever. Only a small majority (n=40, 31.5%) were able to locate the location of the mosquito vectors' breeding sites. The majority of responders (n=102, 80.31%) were able to identify the vectors' habitat. The majority of respondents have great perceptions about how the disease is spread (n= 113, 88.976 %) and the associated symptoms (n= 127, 100%). However, quite few respondents (n=33, 25.98%) are aware of the medical treatment for dengue fever.

From the analysis on question items regarding Dengue Fever, the top 2 most correct answered question items were 1) What are the symptoms for dengue? (n=127, 100%) 2) How is dengue transmitted? (n=113, 88.98%). For the question items that had the least correct answers were 1) How can dengue be treated? There were 33 participants who answered this question correctly. 2) Where does the dengue mosquito breed (lay eggs)? 40 participants who answered this question correctly.

Table 2. Number and percentage of corrected answers by participants regarding knowledge about Dengue Fever

Knowledge about Dengue Fever	N (%)	%
What is the cause of dengue fever?	58 (45.67)	45.67
What do dengue mosquitoes look like?	97 (76)	76
Where does the dengue mosquito breed (lays eggs)?	40 (31.5)	31.5
Where does the dengue mosquito prefer living?	102	80.31
How is dengue transmitted?	113	88.98
What are the symptoms for dengue?	127	100
How can dengue be treated?	33	25.98

Attitudes towards Dengue Fever. More than a quarter (n=105, 82.67%) of respondents strongly agree that taking family members to the doctor right away if they display related dengue fever symptoms is the best course of action. Additionally, participants strongly agree that it is everyone's responsibility to prevent the spread of dengue disease (n= 97, 76.37 %) and mosquito breeding sites including water containers, storage tanks, and plant pots should be cleaned (n= 92, 72.44 %). The response to "Dengue is a serious illness" (n= 58, 45.67%), "Dengue can be prevented" (n=55, 43.30%) and "Dengue fever cases are expected to rise in Thailand in the future" (n = 41, 32.28%) were the topics where participants strongly agreed the least.

From the analysis on question items regarding the awareness attitudes towards Dengue Fever, the top 3 items that participants answered 'Strongly agree' the most were 1) "If a member of my family develops signs of dengue fever, I will take him or her to the doctor immediately" (n= 105, 82.67%) 2) "Aedes mosquito breeding areas, such as water containers, storage tanks, and plant pots, should be cleaned" (n=97, 76.37%) and 3) "It is the responsibility of all members of the community to prevent the spread of dengue fever" (n=92, 72.44%). For the response that participants answered the least 'Always' were 1) "Dengue is a serious illness" (n= 58, 45.67%) 2) "Dengue can be prevented" (n= 55, 43.30%) 3) "Dengue fever cases are expected to rise in Thailand in the future" (n= 52, 40.94%).

Table 3. Number and percentage of participants about the awareness attitudes towards Dengue Fever

Attitudes towards Dengue Fever	Strongly Agree	%	Agree	%	Not sure	%	Disagree	%
1. Dengue is a serious illness	58	45.67	54	42.52	13	10.23	2	1.57
2. Dengue can be prevented	55	43.30	56	44.09	13	10.23	3	2.36
3. I am responsible for ensuring that no Aedes eggs or larvae are present in my house area	60	47.24	41	32.28	24	18.89	2	1.57
4. Aedes mosquito breeding areas, such as water containers, storage tanks, and plant pots, should be cleaned	97	76.37	24	18.89	4	3.14	2	1.57
5. It is the responsibility of all members of the community to prevent the spread of dengue fever.	92	72.44	26	20.47	7	5.51	2	1.57
6. We should regularly check the dengue situation around our area	70	55.11	48	37.79	9	7.08	0	0
7. Even when there is no dengue fever spreading, mosquito breeding areas should be removed on a regular basis	88	69.29	35	27.55	2	1.57	2	1.57
8. The community's commitment to removing mosquito breeding areas is critical to dengue fever control	82	64.56	38	29.92	7	5.51	0	0
9. If a member of my family develops signs of dengue fever, I will take him or her to the doctor immediately	105	82.67	17	13.38	5	3.93	0	0
10. Dengue fever cases are expected to rise in Thailand in the future	52	40.94	32	25.19	41	32.28	2	1.57

Prevention and control of Dengue Fever. Half of the respondents agree to use electric fans (n=49, 38.58%) and spray insecticides (n=65, 51.15%). Many students (n=63, 49.60%) agree to use detergent and vinegar to exterminate larvae. Similarly, a number of students sleep in a bed net or window screening room (n=62, 48.84%). Respondents partly agree to try keeping the vases or pots that serve as mosquito breeding grounds clean (n=56; 44.09 %). Great number of respondents agree to join the dengue fever community program (n=64, 50.39%) and partly agree to share information or display posters regarding dengue prevention (n=68, 53.54%). The actions that respondents agree to always partake in include applying lotion and mosquito repellent (n=77, 60.62 %). Respondents partly agree to wear long sleeves either during the day and at night (n=61, 48.03%).

From the analysis on question items regarding the perception of preventing and controlling Dengue Fever, the top 3 items that participants answered 'Agree' the most were 1) "Use mosquito repellent/ Lotion" (n= 77, 60.62%) 2) "Vinegar and detergent to kill larvae" (n=63, 49.60%) and 3) "Participate in Dengue Fever campaigns" (n=56, 44.09%). For the response that participants answered the least 'Agree' were 1) "Share information or display posters regarding Dengue prevention" (n= 38, 29.92%) 2) "Clean vases or pots" (n= 38, 29.92%) 3) "Change water containers" (n= 33, 25.96%) and 4) "Wear long sleeves during the day/night time" (n=30, 23.62%).

Table 4. Number and percentage of participants about Attitude toward Prevention and Control on Dengue fever

Prevention and control on Dengue Fever	Agree (%)	Maybe (%)	Disagree (%)
1. Spraying insecticides to kill mosquitoes	46 (36.22)	65 (51.18)	16 (12.59)
2. Electric fans to keep away mosquito	47 (37.00)	49 (38.58)	31 (24.40)
3. Vinegar and detergent to kill larvae	63 (49.60)	48 (37.79)	16 (12.59)
4. Sleep with bednet/window screening room	62 (48.81)	52 (40.94)	13 (10.23)
5. Clean vases or pots	38 (29.92)	56 (40.09)	33 (25.98)
6. Participate in Dengue Fever campaigns	56 (44.09)	64 (50.39)	7 (5.51)
7. Use mosquito repellent/ Lotion	77 (60.62)	44 (34.64)	6 (4.72)
8. Change water containers	33 (25.96)	58 (45.66)	36 (28.94)
9. Share information or display posters regarding Dengue prevention	38 (29.92)	68 (53.54)	21 (16.53)
10. Wear long sleeves during the day/night time	30 (23.62)	61 (48.03)	36 (28.34)

In terms of practices in relation to dengue fever, the majority of participants occasionally take part in campaigns to raise awareness of the disease (n=51, 40.15 %). Most of the participants constantly keep up with the most recent information on dengue from several dependable sources (n=59, 46.45 %). In the majority of participants (n=48, 37.7%), the usage of insect repellent and other mosquito repellants including mosquito coils and bed nets is used only on some occasions. Actions towards maintaining cleanliness of storage tanks (n= 53, 41.73%) and plant pots (n= 47, 37.00%) are the course of action that the participant always does. Students often check the presence of larvae (n= 42, 33.07%) and avoid mosquito bites by wearing long sleeved shirts and long pants (n= 48, 37.79%).

From the analysis on question items regarding the practices towards Dengue Fever, the top 3 items that participants answered, 'Always' the most were 1) "I follow the latest information from reliable sources." (n= 59, 46.45%) 2) "I cover water storage containers properly, scrub and clean the interior sides of the containers" (n=53, 41.73%) and 3) "I visit the hospital for test and treatment when I see the symptoms of dengue fever" (n=50, 39.37%). For the response that participants answered the least 'Always' were 1) "Apply mosquito repellent lotion on your skin." (n= 33, 25.95%) 2) "To avoid mosquito bites, wear long-sleeved shirts and long pants." (n= 31, 24.40%) 3) "I'll take part in a public demonstration to raise awareness about dengue fever." (n= 22, 17.32%).

Table 5. Number and percentage of participants about the practices towards Dengue Fever

Practices towards Dengue Fever	Always (%)	Often (%)	Sometimes (%)	Never (%)
1. I use insect repellent, as well as mosquito coils, electrical mosquito mats, and mosquito bed nets.	34 (26.77)	41 (32.28)	48 (37.79)	4 (3.14)
2. I'll take part in a public demonstration to raise awareness about dengue fever.	22 (17.32)	26 (20.47)	51 (40.15)	28 (22.04)
3. I cover water storage containers properly, scrub and clean the interior sides of the containers	53 (41.73)	44 (34.64)	27 (21.25)	3 (2.36)
4. I check for the presence of Aedes eggs and/or larvae inside or outside the house	34 (26.77)	42 (33.07)	35 (27.55)	16 (12.59)
5. I dispose of plastic and glass wastes that serve as larval habitats.	44 (34.64)	34 (26.77)	27 (21.25)	22 (17.32)
6. I maintain the plant pots clear of excess water and drain it.	47 (37)	41 (32.28)	33 (25.98)	6 (4.72)
7. Apply mosquito repellent lotion on your skin.	33 (25.95)	29 (22.83)	58 (45.66)	7 (5.51)
8. To avoid mosquito bites, wear long-sleeved shirts and long pants.	31 (24.40)	48 (37.79)	41 (32.28)	7 (5.51)
9. I visit the hospital for test and treatment when I see the symptoms of dengue fever	50 (39.37)	30 (23.62)	24 (18.89)	23 (18.11)
10. I follow the latest information from reliable sources.	59 (46.45)	36 (28.34)	25 (19.68)	7 (5.51)

5. Discussion

The study assessed the knowledge, attitudes on dengue fever, attitudes on prevention and control, and practices towards dengue fever of secondary students in Bangkok. The results of this survey, which included 127 students, showed that most participants had a moderate score for knowledge about dengue fever ($M = 4.488$, $SD = 1.154$), and most participants displayed a good attitude towards dengue fever ($M = 34.76$, $SD = 4.078$). Most participants expressed a moderate level of attitude towards preventing and controlling dengue fever ($M = 21.52$, $SD = 3.986$), and they also implemented dengue fever practices at a moderate level ($M = 28.36$, $SD = 6.202$).

According to this study, participants demonstrated a neutral level of knowledge towards dengue fever ($M = 4.488$, $SD = 1.154$). One of the possible reasons attributed to this might be the lack of attention to the proper education about dengue disease from school. Education on diseases including dengue fever is taught in primary education but depending on the individual's attention to the class lectures which contributes to the reason why some students show a great knowledge, and some do not. Attending programs is one approach to further overall education on dengue fever. This finding is in line with Suda Hanklang (2018). An intervention program conducted among a group of rural communities, this involves providing knowledge about dengue hemorrhagic fever, conducting group education, and engaging in campaign activities. The findings showed that this intervention program effectively enhanced knowledge, a factor that strongly aids preventative action. This suggests that in order to minimize the spread of the dengue virus, education is crucial.

In relation to the attitude towards dengue fever, participants indicate a good level of attitudes towards dengue fever. This perhaps suggests that a great knowledge contributes to greater awareness. Other studies reported similar findings (Anita Archarya et al, 2005, Ibrahim et al, 2009). A high level of dengue awareness attitude was observed among the participants who attributed to the disease education and information campaign.

Attitudes on prevention and control on dengue fever among participants were shown to be at a moderate level. This may be similar to the attitude toward dengue fever; knowledge was likewise the primary factor in the neutral level of attitudes toward dengue fever prevention and control.

Participants in this study showed a neutral level of practice for preventing dengue illness. This may be because dengue fever has been widespread in Thailand for many years and as time goes on, less attention is being devoted to it. Additionally, participants could not have received the required teaching or practice on dengue fever, which should be provided by parents or the school system.

One interesting finding from the study was that there were inconsistent gender differences in male and female knowledge, attitudes, practices, and attitudes about dengue fever prevention. Compared with females, male lacked knowledge and positive attitudes about dengue fever. However, they were more likely than females to have proper attitudes in preventing the disease and practices. This was caused in part by the possibility that female students can be lazy when it comes to performing physical tasks such as cleaning storage tanks and spraying insect repellent. Similar to this, male students might not actively participate in lectures regarding dengue fever. As a result, female students acquired a constructive attitude and a greater knowledge about dengue disease.

Another intriguing phenomenon found from this study was that students in the age group of 11-14 have the greatest knowledge score among the rest of the age groups. The reason behind this was probably because they are interested and prone to new knowledge about health education including dengue illness.

Students older than 18 years old indicate a positive attitude and the best practices towards dengue fever, this is probably due to adolescents being mature enough to take responsibility and take action on prevention of the dengue illness. The interactions of the younger students of age range 11-14 and 15-17 to prevent and do practical practices on dengue fever could be limited due to the age number.

6. Limitation

This study was carried out in certain areas of Thailand and thus findings might not be generalizable across Thailand. The survey was conducted via an online Google form so there is no physical consultation.

7. Conclusion

A total of 127 students participated in this study, the results showed that most participants had a moderate score for knowledge about dengue fever ($M= 4.488$, $SD= 1.154$), and most participants displayed a good attitude towards dengue fever ($M= 34.76$, $SD= 4.078$). Most participants expressed a moderate level of attitude towards preventing and controlling dengue fever ($M= 21.52$, $SD= 3.986$), and they also implemented dengue fever practices at a moderate level ($M= 28.36$, $SD= 6.202$).

8. Recommendation

8.1. Preventions and Control methods

Preventive measures are designed to avoid risks, whereas control measures are designed to reduce and manage risks. It has been emphasized that the knowledge, education, and behavior of the people and tactics engaged are key factors in the effectiveness of community-based solutions. In order to prevent dengue, the release of knowledge creates awareness and offers the required tools for eliminating mosquito habitats.

The utilization of insecticides is an effective method to eliminate vectors. For many years, chemical substances known as pesticides have been used to reduce mosquito populations. These pesticides rose to the top of the list of integrated strategies, but their continued usage led to resistance in the population of the target vectors and might have an adverse effect on the ecosystem.

Community-based control programs are developed to educate the community about the initial actions to get rid of mosquito breeding places. The importance of community-based dengue mosquito eradication programs has been demonstrated in many countries which help to increase community awareness. These programs could potentially reduce the dengue vectors and transmission.

References

- Centers for Disease Control and Prevention. Dengue virus. Last reviewed: November 15, 2021. Available from: <https://www.cdc.gov/dengue/index.html>
- European Centre for Disease Prevention and Control. Fact Sheet about dengue. Last updated 4 Mar 2021. Available from: <https://www.ecdc.europa.eu/en/dengue-fever/facts>
- World Health Organisation Regional Office for South-East Asia, New Delhi, June 2002. Dengue/ Dengue Haemorrhagic Fever Prevention and Control. Report of an Intercountry Consultation of Programme Managers of DF/DHF Batam, Indonesia, 10-13 July 2001. SEA-Haem.Fev.-75. Available from: <https://apps.who.int/iris/bitstream/handle/10665/204951/B3360.pdf?sequence=1&isAllowed=1>
- World Health Organisation. Dengue and severe dengue. Last updated 10 January 2022. Available from: <https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue>
- Bumrungrad International Hospital. Dengue Fever in Thailand: Important Things to Know. Last updated November 19, 2011. Available from: <https://www.bumrungrad.com/en/health-blog/november-2011/dengue-fever-in-thailand-important-things-to-know>
- Suda Hanklang, Paul Ratanasiripong, Suleegorn Sivasan. Effectiveness of the intervention program for dengue hemorrhagic fever prevention among rural communities in Thailand. Available from: <https://www.emerald.com/insight/content/doi/10.1108/JHR-08-2018-042/full/html>
- Anita Acharya, K. Goswami, S. Srinath, et al. Awareness about dengue syndrome and related preventive practices amongst residents of an urban resettlement colony of south Delhi. Journal of Vector Borne Diseases 42(3):122-7. Published in October 2005. Available from: https://www.researchgate.net/publication/7473457_Awareness_about_dengue_syndrome_and_related_preventive_practices_amongst_residents_of_an_urban_resettlement_colony_of_south_Delhi
- Ibrahim NK, Abalkhail B, Rady M, et al. An educational programme on dengue fever prevention and control for females in Jeddah high schools. East Mediterr Health J 2009;15(5):1059-65. Available from: https://www.researchgate.net/publication/41847362_An_educational_programme_on_dengue_fever_prevention_and_control_for_females_in_Jeddah_high_schools
- Centers for Disease Control and Prevention. Mosquito Control. Last page reviewed May 5, 2022. Available from: <https://www.cdc.gov/mosquitoes/mosquito-control/index.html>
- Irfan A. Rather, Hilal A. Parray, Jameel B. Lone, et al. Prevention and Control Strategies to Counter Dengue Virus Infection. Front Cell Infect Microbiol. 2017; 7: 336. Published online 2017 Jul 25. doi: 10.3389/fcimb.2017.00336. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5524668/>
- K P Jayawickreme, D K Jayaweera, S Weerasinghe, et al. A study on knowledge, attitudes and practices regarding dengue fever, its prevention and management among dengue patients presenting to a tertiary care hospital in Sri Lanka. BMC Infect Dis. 2021 Sep 20;21(1):981. doi: 10.1186/s12879-021-06685-5. Available from: <https://pubmed.ncbi.nlm.nih.gov/34544378/>
- Abdul Zahir, Asad Ullah, Mussawar Shah, et al. Community participation, Dengue fever prevention and control practices in Swat, Pakistan. Int J MCH AIDS. 2016;5(1):39-45. doi: 10.21106/ijma.68. Available from: <https://pubmed.ncbi.nlm.nih.gov/28058191/>

- J. Noorlaile, K. Manimaran, S. Kamarul Zaman, et al. Development of assessment tool to measure children's knowledge on Dengue prevention activities in Malaysia. Available from: <https://www.hindawi.com/journals/jtm/2022/2533900/>
- Bienvenido A. Veras-Estévez, Helena J. Chapman. Health workers' perceived challenges for dengue prevention and control in the Dominican Republic. *International Journal of Cuban Health & Medicine* 19 (4) Oct 2017. Available from: <https://www.scielosp.org/article/medicc/2017.v19n4/26-34/#:~:text=Health%20workers%20described%20the%20following,in%20sustainability%20of%20government%20interventions.>
- Kok Pim Kua. A multifactorial strategy for dengue prevention and control: a public health situation analysis. First Published January 31, 2022. Available from: <https://journals.sagepub.com/doi/abs/10.1177/00494755221076910>
- Nismat Javed, Haider Ghazanfar, and Sajida Naseem. Knowledge of Dengue Among Students Exposed to Various Awareness Campaigns in Model Schools of Islamabad: A Cross-Sectional Study. *Cureus*. 2018 Apr; 10(4): e2455. Published online 2018 Apr 10. doi: 10.7759/cureus.2455. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5991922/>
- Sami Abdo Radman Al-Dubai 1, Kurubaran Ganasegeran, Alwan Mohanad Rahman, et al. Factors affecting dengue fever knowledge, attitudes and practices among selected urban, semi-urban and rural communities in Malaysia. *Southeast Asian J Trop Med Public Health*. 2013 Jan;44(1):37-49. Available from: https://assets.cureus.com/uploads/original_article/pdf/11239/1612427732-1612427727-20210204-18204-101nbn.pdf
- Salma Akhter, Meredith Robbins, Perry Curtis, et al. Online survey of university students' perception, awareness and adherence to COVID-19 prevention measures. Published: 13 May 2022. Available from: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-022-13356-w>