Scoping Review: Barrier to The Knowledge, Attitude and Practice on Dengue Prevention

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ABSTRACT
Dengue fever is a vector-borne endemic disease that affects over 30 million Malaysians. Preventing the elimination of Aedes breeding sites is a necessary precautionary measure to strengthen the knowledge, attitudes and practices of the community. The aim of this study is to identify barriers to the knowledge, attitudes and practices of dengue prevention in the community through the study of selected articles published between 2010 and 2018. The present paper carried out a scoping review of available literature using Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines. The title and abstract of each study were screened and relevant studies were further assessed for eligibility. A total of 1352 related articles were selected for this scoping review. Of these, 349 articles were found to be in line with the study objectives and 25 articles related to dengue prevention knowledge, attitudes and practices were discussed in this study. Conclusions and Recommendations: This review suggests that factors interfering with dengue prevention behaviours are divided into two factors, namely, the internal factors that encompass attitudes and perceptions of dengue prevention behaviours, and the environmental factors such as weather, drainage systems, buildings designed with unreachable rain gutters and also poor drainage and piping system have found to be the Aedes habitats. Therefore, interventions are normally...
performed to prevent an incident to re-instill positive attitudes and perceptions among the community members should be strengthened through appropriate and ongoing community programs such as COMBI and Search & Destroy campaign organized by Ministry of Health Malaysia.

**Contribution/Originality:** This study contributes to the existing literature on knowledge, attitudes and practices among public regarding dengue prevention and success of disease control. Understanding the knowledge, attitude and practices of the general community on dengue prevention will provide valuable information for effective strategic planning and engaging the public in dengue control.

1. **Introduction**

Dengue is one of the major arbovirus diseases in Malaysia and is capable of becoming an epidemic. A total of 88,029 cases of dengue fever with 142 deaths were reported to have occurred throughout Malaysia from 29 December 2019 to 21 December 2020. So far there is no effective treatment or specific vaccine. Therefore, preventive strategies such as community involvement strategies to mobilize the community to work with the authorities have been focused on preventing the spread of the disease by conducting intervention activities that focus on mosquito bite prevention and control. Various prevention strategies such as community engagement programs, awareness campaigns, strategic collaboration have been organised especially in hotspot areas. Due to the intensity of the problem, Ministry of Health Malaysia has endorsed a Strategic Plan for the Prevention and Control of Dengue 2009-2013. Which consist of dengue control strategies such as dengue surveillance, treatment programs, social mobilization and communication, dengue research outbreak response and Dengue Integrated Vector Management program. The plan has helped significantly in reducing dengue cases.

More than 100,000 cases of dengue were recorded every year with the highest number of cases in 2015 at 120,836 cases and 50% were from the state of Selangor alone. Even with the ongoing implementation of the Dengue Prevention and Control Strategic Plan initiative, data for dengue cases showed an upcoming trend. Although there was a decrease in cases to 101,357 cases in 2016 and 83,849 cases in 2017, a significant increase occurred in 2019 where a total of 118,416 cases were recorded, namely an increase of 70% compared to the total number of cases in 2018. While until June 2020 there were 48,584 cases recorded with an increase of 8% every week. This situation shows that dengue cases are difficult to control and the numbers are still high and alarming. In order to control and reduce the cases of dengue an ongoing involvement and commitment of the community is needed in order to increase knowledge and form positive behaviors among the community. A study by Lin et al. (2016), Vanlerberghe et al., (2009), Heintze et al. (2007), Romani et al. (2007), Perez et al. (2009) showed that community involvement, the sustainability of activities, effective monitoring, innovation of intervention programs can increase the effectiveness of dengue prevention programs and behavior change.

Even though in Malaysia, various health education activities have been conducted to increase the knowledge and understanding of the community about the dengue epidemic. But still found that there are some residents who failed to comply to the cleanliness of the environment by disposing of garbage at will, storing used items in appropriate way, piling plastic containers inside and outside the house, which leaving clogged drains and puddles of water under flats have become breeding grounds for mosquitoes.
Through the Communication for Behavioral Impact (COMBI) program, people from various levels are given exposure and training to work together with the Ministry of Health to empower the community to carry out dengue prevention activities systematically. COMBI stands for "Communication for Behavioral Impact" or "Communication for Behavior Change". COMBI was introduced by the World Health Organization (WHO, 2009) in 2009 as one of the strategies to address the Dengue problem in Malaysia. COMBI is a dynamic approach that uses social mobilization and communication strategies to influence individuals, families and communities towards healthy behavior change. COMBI approach was developed based several theories of behavior change, communication and social marketing to address community health issues. COMBI is also a comprehensive and flexible approach to plan, implement and monitor social mobilization and communication actions that can be modified and tested according to the behavioural objectives that have been selected (MOH Health Info).

Through this program, the community is advised to inspect the larvae breeding grounds 10 minutes once a week, maintain cleanliness inside and outside the house, cooperate in gotong royong activities, convey information to the community through various communication channels such as advocacy, social mobilization, publicity, personal presentation as well as service promotion. These programs can increase the level of knowledge, attitude and even community practice. Even so, the study found that behaviour change only lasts for a short period of time and requires constant monitoring apart from the difficulty of obtaining voluntary leadership in society as a role model. Studies conducted by Koenraadt et al. (2006), Shuaib et al. (2010), Al-Dubai et al. (2013), and Nur Ain et al. (2017) found that dengue prevention requires the involvement of the entire community to reduce the breeding of Aedes mosquitoes.

Perception factors, self-efficacy and desire to change need to be considered because high knowledge and a good attitude are found to be insufficient to lead to positive behaviour. Activities involving community need to be strengthen in order to sustain dengue prevention practices inculcating a responsible nature and also empowering communities to make decisions (Perez et al., 2007). Communicating information to strengthen knowledge about dengue prevention as well as recommendations to be positive is still inadequate and requires society to look at dengue problems from a sociological perspective (Green et al., 2005).

Various interventions and prevention methods have been carried out to deal with the dengue epidemic both in Malaysia and around the world. Prevention programs are carried out through the selection and use of the most appropriate intervention methods as well as the use of the best vector control equipment. Even so, the dengue epidemic shows an increasing trend and it raises the question of whether community behaviour is inadequate in preventive activities as well as what is the relationship between the level of knowledge and attitude towards community behaviour. To answer this question, a scoping survey was conducted to find out more about the question to obtain meta-analysis evidence.

2. Methods

Potential and relevant articles are identified through the article review process (scoping review) through comprehensive search strategy steps in four databases (Google Scholar, PubMed; World Health Organization Database and Semantic Scholar) and set search years from 2010 to 2018. Keywords “knowledge”, “attitudes” and “practices”, “dengue prevention”, “knowledge, attitude and practice”, “dengue prevention” we used Boolean
Operators such as OR, AND, etc. have been used in making information searches. Articles are organized according to the objectives, identify relevant articles, evaluate articles to minimize bias and extract data according to the specified format. Two independent reviewers have conducted research according to the article review report (scoping review) based on PRISMA reporting guidelines.

2.1. Inclusion and exclusion criteria

Table 1 displays the article inclusion and exclusion criteria. Only studies showing data related to barriers to dengue prevention behaviour are included in the list of articles examined to obtain information related to the problem.

Table 1: Criteria for inclusion and exclusion criteria of study articles

<table>
<thead>
<tr>
<th>Study design</th>
<th>Inclusion</th>
<th>Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative and qualitative study design</td>
<td>Report papers in the form of opinion papers.</td>
<td></td>
</tr>
<tr>
<td>Dengue</td>
<td>Studies on dengue-related problems</td>
<td>Studies not related to dengue such as malaria, chikungunya and so on.</td>
</tr>
<tr>
<td>Study finding</td>
<td>The results of the study discuss the factors of knowledge, attitudes and practices related to dengue prevention.</td>
<td>Studies that do not discuss one of the factors related to the barrier to dengue prevention behavior.</td>
</tr>
<tr>
<td>Year of publication</td>
<td>2010 to 2018 and 2019 updates</td>
<td>Publications before 2010</td>
</tr>
</tbody>
</table>

2.2. Measurement of study results

The main outcomes identified were barriers to dengue prevention practices caused by knowledge factors, attitudes and other related factors. Although there are other factors that contribute to the increase in dengue cases such as weather factors, terrain, building design, it is not discussed in depth because the main focus of this study is to assess behavioural factors. Diagram 1 show that the measurement of the results of this study was determined according to the PRISMA guidelines as a standard methodology (Moher et al., 2009).

2.3. Search strategy

Google Scholar Database, PubMed; The World Health Organization Database and Semantic Scholar are searched using the Medical Subject (MeSH) title "dengue" followed by the term "AND 'with" unpaid text "then the term" dengue prevention barrier "and combined with" knowledge factors, attitudes and practices ". Reference lists from articles are also identified and quotations from unpublished documents are also included such as excerpts from relevant student theses. The year of publication set for articles taken from the database is from 2010 to 2018 but is updated if there are the latest relevant articles. Publishing articles is in Bahasa Melayu and English.

2.4. Methods of selection and evaluation

The search results are imported into the Mendeley app for note management and annotation to make it easier for researchers to locate important passages in articles. Each article will be evaluated according to the suitability of the title through an abstract or a
complete article before being selected according to the acceptance criteria. Each article to be selected is discussed in advance and reviewed by two (2) evaluators to determine which articles are acceptable. Any differences and suggestions from the evaluators will be taken into account before a complete article is taken for further review. The evaluator will contact the researcher if there is a lack of clear article selection such as lack of data from the article or inaccessible data sources.

2.5. Data extraction

Researchers and evaluators will extract the data independently according to the agreed checklist and any differences of opinion will be discussed. Study design and data characteristics from each study will be identified to avoid the risk of biased information caused by sampling technical factors, data analysis and so on. The main keywords of the study, namely "knowledge", "attitude", "behaviour" and "dengue prevention barrier factors" can help the selection and review of articles according to standard methods.

2.6. Risk of biased assessment

Biased risk assessment (bias) is conducted according to the format provided from the checklist (pre-pilot form) by the evaluator independently and discuss the differences in findings. Consent to accept or reject the discrepancy of findings depends on the basic guidelines and a review is made to obtain confirmation of agreement in accordance with PRISMA guidelines.

2.7. Data analysis

The analysis is done in Review Manager (Rev. Man Version 5.2. Copenhagen: The Nordic. Through this method the article is processed according to a specific code. The code constructed helps identify important variables to be discussed and compared. -coding features that have been set. The study data is broken down into several part codes namely part number, author, location, study objectives, study design, analysis data & study results and conclusions and recommendations. Research results are made in the form of tables to facilitate the process of data entry systematically and help identify the data needed in each article.

3. Result

A total of 1352 articles were obtained from the database and an additional five articles from the unpublished study report. Similar articles obtained from different databases (duplicate articles) were removed and the total number of articles relevant to this scoping review study was 1054. Of these, a total of 303 articles were found to fit the objectives of the study but for the purpose of this review, a total of 25 articles touched on knowledge, attitudes and practices of dengue prevention that are further studied for comparison and data synthesis.

Of the 25 (n = 25) articles studying the aspects of knowledge, attitudes and practices of dengue prevention consisting of 9 studies are from Malaysia, 2 studies from India, 2 studies from Republic Lao, 2 studies from Thailand and 1 study from Indonesia, Pakistan, Yemen, Jamaica, Brazil and Cuba. Selected studies were published between 2010 to 2018 were as many as 40% (n = 10) were articles published in 2015 and above. Through methodological research, there are articles that have the potential for bias because there
is a possibility of not describing confounding factors in the results of their study, do not state the process of validity and reliability of the questionnaire, study design, selection of respondents and data analysis due to scoping study design this does not overemphasize the importance of determining the characteristics of an article.

Diagram 1: Flow Chart Shows Article Selection According to PRISMA Guide

4. Discussion

4.1. General knowledge of dengue

The results of the study found that most studies show that the majority of respondents have a high level of knowledge about dengue fever. Every article that discusses the causes of dengue fever, breeding grounds and prevention methods shows that the community has a good level of knowledge where the percentage of well-informed respondents is between 60% to 90% of the total respondents. The level of knowledge, attitude and practice of the respondents were found to be higher in the dengue epidemic area (hotspot) than the study in the controlled dengue area. Three studies conducted in epidemic areas in Malaysia found that between 61% to 97% of respondents have a good
level of dengue-related knowledge, be positive and also say that dengue prevention practices have a positive relationship with the level of knowledge and attitude (Azfar et al., 2017; Firdous et al., 2017).

Studies in longer dengue outbreaks have shown that the longer the area is a hotspot, the higher the level of knowledge of respondents in the area. A study by Nur Ain et al. (2017) conducted in a long-term hotspot locality in Selangor showed that 98% of respondents have knowledge of Aedes breeding grounds while as many as 98.4% of respondents have the attitude and belief that dengue can be controlled. However, 73% of respondents do not do effective dengue prevention activities. The majority of respondents said that the use of print and electronic media is very important as a source of information on dengue (Hairi et al., 2003; Shuaib et al., 2010; Chandren et al., 2015; AA et al., 2017).

However, there are studies that show that dengue prevention practices are not necessarily in line with positive levels of knowledge and attitudes. A total of 12 (48%) articles from 25 studies that were carefully analyzed found that the level of knowledge and good attitude among the respondents did not encourage good practice on dengue prevention behavior as shown in the study conducted by Hairi et al. (2003), Saied et al. (2015), Shuaib et al. (2010), Sayavong et al. (2015), Al Zurfi et al. (2015), Koenraadt et al. (2006), AA et al. (2017) and Nur Ain et al. (2017).

A study conducted by Alves et. al (2016) in Ribeirao Preto, Brazil showed that 9.4% of respondents who inspected the larval breeding grounds outside the house, cleaned the reservoir, cooperated with the community and 21.3% who maintained the cleanliness and beauty of the environment. A cross-sectional study of 265 respondents in Felda Sungai Pancing Timur, Kuantan found that only 28.7% of respondents were involved in the cleanliness of community areas compared to the higher level of knowledge of 53.2% (AA et al., 2017).

4.2. Analysis of barriers to dengue prevention practices among respondents

4.2.1. Lack of cooperation in community activities

Dengue prevention requires cooperation between residents and authorities regardless of political differences, community positions and the need to avoid pointing fingers at the faults of others. Diversity of background, socio-economic differences, differences in level of education, differences in culture and value systems create different perceptions in something that involves the community. A study by Saied et al. (2015) and AA et al. (2017) showed that there are community members who are less caring and try to avoid community programs related to dengue prevention due to lack of self-confidence to engage in community activities due to feelings of shame, inferiority and feeling of unappreciated presence. In this regard, a study by Al-Dubai et al. (2013) showed that communities in rural areas were found to show a more cooperative attitude in doing gotong royong to prevent dengue compared to urban communities due to the different social values among them. The effects of lack of coordination and cooperation in the community cause the risk of dengue to increase in most areas due to misunderstandings among communities, leaders and government agencies. Therefore, the prevention of dengue fever is a difficult task and society is increasingly exposed to the risk of loss of life. Although, respondents have a good knowledge of dengue prevention and its control however, the study found a lack of coordination of activities at the community level as each government and community agency has different strategies and jurisdictions in the
implementation of dengue prevention methods. The implementation of effective methods requires coordination between the Health Agency, the Municipal Council and the Career Department and the community to control the dengue vector (Claro et al., 2006). Coordination of activities in the community is closely related to local leadership style. Less active leaders are unable to mobilize the community to jointly contribute time, energy and financial constraints to carry out activities (Spiegel et al., 2012).

Community cooperation and participation should be strengthened through dengue prevention campaigns that encourage communities to keep their living environment clean, dispose of leftover water and plant equipment that can hold water. The results of the study of Spiegel et al., (2012) stated that the dengue vector can be eradicated through cooperation between communities, leaders and government agencies. The results show that good practice for dengue control depends on awareness campaigns and information on dengue fever. Therefore, people can eradicate dengue breeding grounds if they participate in dengue awareness campaigns and impart knowledge about dengue fever among the community.

4.2.2. Lack of self-belonging

The nature of belonging is a human emotional feeling to be part of a group in society such as religious groups, employment groups, friendship groups and so on including community groups that work together to prevent dengue. The feeling of wanting to be important and self-esteem through involvement in community activities is a key component in dengue prevention strategies. A study by Hystad and Carpiano (2012) in Canada, stated changes in community health behaviour have a positive relationship with belonging properties if health programs are conducted consistently and community involvement is ongoing. From the results of this scoping study, it was found that health agencies have designed a community cooperation program that emphasizes the spirit of belonging as a suitable platform for the community to carry out joint dengue prevention activities such as the Communication for Behavioural Impact (COMBI) program. The application of belonging properties in the COMBI program is done through effective communication strategies, training methods and demonstrations to encourage the community to plan, coordinate and implement dengue prevention activities at the community level. However, there are localities that are not able to continue the sustainability of the establishment of an organization due to lack of ownership of the program conducted and also the weakness of leadership factors. Society places the responsibility of dengue prevention on the authorities to address these problems (Toledo et al., 2007). A study by Zulkify, (2016) showed that localities that have well-organized activities and good coordination are able to motivate the community to be equally involved in dengue prevention activities. A trend analysis study that examines the relationship between the number of dengue hotspots with the establishment of COMBI in Seremban, Negeri Sembilan shows that non-COMBI localities recorded higher dengue cases than COMBI localities as reported in a study by Nor and Er (2016) due to lack of properties belong. In addition, the type of residential house (terrace house, low-cost flats, luxury condominiums, residential area of an ownership status (rent or own property) also contributes to the involvement and enthusiasm of dengue prevention programs conducted in a locality (Jismanisa, 2016).
4.2.3. Dependent on the authorities to prevent dengue

Studies in the articles analyse in this review have found that most people think that the task of cleaning a dengue breeding ground is the role of local authorities, health personnel and community members appointed by the community (Saied et al., 2015). In addition, members of the community will be encouraged to carry out community activities if adequate assistance is provided by the government such as equipment, food and drink, program management. Nevertheless, the concept of expecting this assistance can be modified by rebranding activities at the community level by strengthening the high spirit of belonging among the community (Zulkifly, 2016). This is because, most communities need guidance to carry out an activity without expecting help from the authorities completely. A 10-week gotong royong program introduced to the community in Hulu Langat District has given the community the opportunity to participate, coordinate and determine the implementation of dengue prevention activities in their area with the guidance of Health Education Officers. Through this program, the community is increasingly confident to implement prevention activities based on the concept of empowering the community to eradicate dengue (Zulkifly, 2016).

4.2.4. Lack of skills to carry out search activities and destroy breeding grounds

Dengue prevention requires knowledge of the causes of the disease, control methods and skills to avoid dengue outbreaks according to the needs in certain localities. The analysis of this study found that there are respondents who say they lack skills and do not know how to avoid dengue infection even though dengue prevention knowledge is good and satisfactory (Alves et al., 2016). A study by Shuaib et al., (2010) in Westmorel, Jamaica involving a total of 192 clinic visitors found that 77% of respondents are not confident in using personal protective equipment when outdoors due to a lack of understanding and skills and feel awkward while a study by Kittigul et al. (2003) in Ang Thong Thailand found that residents do not feel confident to drink water mixed with abate for fear of poisoning. Studies in dengue hotspot areas in the state Selangor by Nur Ain et al. (2017) found that the skills of using larvae killers, not opening doors and windows during fog spraying, considering fog spraying is very dangerous and considering doing dengue prevention activities is something that is burdensome.

4.2.5. Lack of confidence in the effectiveness of existing prevention methods.

A Qualitative study by Wong and Abu Bakar (2013) who conducted 14 focus group discussions involving 84 respondents in the Klang Valley found that the barriers to low dengue prevention behavior are due to low self-efficacy, low perceptions of the benefits of preventing dengue and also perceptions of disease availability low. Perceptions that tend to be negative towards health beliefs and practices have been among the reasons why respondents are not confident with the available prevention methods and refusal to engage in dengue prevention activities. In fact, this study shows that respondents have faith in traditional dengue prevention methods to prevent dengue infection such as drinking water from the roots of the tree, planting fragrant lemongrass, drinking noni juice and so on (Wong & Abu Bakar, 2013).

Preventing dengue requires the involvement of all residents because the dengue epidemic is a community and national problem. Dengue is difficult to control if there are still people who are negative and neglect the appropriate action to prevent dengue in their area. A study in Negeri Sembilan showed that 38.8% of respondents were not confident that the
The dengue problem could be overcome in their area due to the recurrence of cases and it has become common for them if the residents still do not cooperate with the authorities. The behavior of the people who do not care about the former water reservoirs, the proper disposal of garbage and the unattended environment contribute to the persistent dengue problem (Nor & Er, 2016). A study in Sepang, Selangor found that more than half of the respondents (59%) did not agree with the mist spray method carried out by the authorities because this method is considered ineffective and as many as 73% consider it inconvenient for the population due to the side effects of mist spray. Studies conducted by Al-Dubai et al. (2013), Nur Ain et al. (2017) and Ashok Kumar et al. (2010) found that most respondents felt that they did not practice proper preventive measures because they considered dengue to be a common thing that could be treated in a hospital.

### 4.2.6. Selfishness and indifference to the environment

The results of the study found that residents do less prevention activities together if they find their environment clean and say their place is less mosquito numbers (Wong et al., 2015). There are also some respondents who think that breeding of breeding grounds should only be done when an outbreak occurs in their area. At the family level, a study by Rakhmani et al. (2018) found that a large number of family members can increase the frequency of preventive activities carried out due to the nature of cooperation and also the wider delivery of health messages can be held.

Dengue is caused by the weakness of the water supply system, sewerage and building structures (Toledo et al., 2007). Studies conducted in low-income settlements including Orang Asli settlements, often face inefficient water supply and sewerage systems. This lack of basic facilities causes residents to store water in many storage containers and causes breeding ground risk if not properly maintained (Chandren et al., 2015). A study by Saied et al. 2015 and Ashok Kumar et al., (2010) found that most storage containers were not well maintained which resulted in the breeding of Aedes apart from unsatisfactory drainage systems.

Apart from the individual factors that hinder the practice of prevention, the results of the study also show that the respondent’s reason that natural environmental factors as a cause of dengue cannot be eliminated and feel they are difficult to do anything to change the weather, plants and mosquito habitat. Discussion is not a rewrite of research results, but should contain a brief statement of important parts of the research results, supporting arguments, discussion of other relevant published research results and the contribution of findings to the enrichment and development of science and technology for the community (Mayxay et al., 2013).

### 5. Limitations

This scoping study has identified and screened 1352 articles and only a small part has been researched in more detail for synthesis analysis of selected articles only. Whereas until this article was written there were many publications have been produced in the same scope as the needs of this study which is unlikely to be analysed in these findings.

This scoping study was conducted based on the methodology of Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) which does not overemphasize certain qualities set in the selection of articles. A general selection of all types of published or unpublished articles and even speech texts, symposium abstracts...
can be taken as a source of information. There is a probability that the selected articles use a relatively weak research methodology in the questionnaire, analysis of the study and the findings presented. However, the scoping review technique is important as a method that can help researchers identify articles, organize (mapping) and process data to produce further reviews that are more comprehensive and systematic compared to the literature highlight method. Apart from that, the measuring tools used in the selected articles have their own constructs and the number of items is not the same and it affects the scoring scale for each dimension. Therefore, the comparison of scores between one article and another is different and has interpretations according to the constructs formed in each study.

6. Conclusions

The results of research from most articles show that dengue prevention practices among respondents are low and at a less than satisfactory level when compared to the level of knowledge and attitude of positive respondents. The majority of studies stated that respondents’ practices were found to be inadequate in efforts to curb dengue problems and required ongoing behavior change interventions because dengue cases in the study area showed alarming trends (Shafique et al., 2019; Laura et al., 2014, Bhatt et al., 2013). The barriers to low dengue prevention practices are due to two main factors, namely the internal factors of individuals related to attitudes and perceptions and external factors caused by environmental conditions such as weather, drainage systems, dilapidated building conditions and environmental waste disposal systems. Individual factors need to be addressed with ongoing behaviour change interventions by mobilizing social networks and organizations within the community through the implementation of rigorous policies and procedures such as enforcement and punishment. Cooperation between the community and the authorities should be intensified by conducting discussions and implementation of the program jointly based on the needs in a locality. Complex dengue problems caused by environmental factors require an efficient network of inter-agency coordination covering epidemiological surveillance, community involvement, environmental monitoring, risk communication, health education and even effective vector control.

Ongoing dengue control requires cooperation between authorities, civil society, non-governmental organizations, the private sector, politicians, public health officials, administrators, engineers, town planners and the environment to strengthen the intersectoral management structure to support community action to prevent dengue (San Martin & Brathwaite-Dick, 2007).

Community-based dengue prevention programs require ongoing action to drive more effective behavior change. Interventions should not only be based on changes in the behaviour of individuals, families and groups, but also require policy-level changes that involve stakeholders who have the power and ability to make physical and environmental changes. Dengue prevention practices can be implemented with efficient infrastructure support and it is the responsibility of all parties including neighbours, the community, local authorities and health agencies to prevent and control this problem.
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Ethical Approval

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Conflict of Interests

The authors declare no conflict of interest in this study.

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