

Health Belief Model Determinants of Dengue Prevention Practices Among Rural Residents in Zambales, Philippines

Argel Joseph C. Mayo^{1*}, Darwin P. Paguio²

¹ Professor, Manuel V. Gallego Foundation Colleges, Inc., Cabanatuan City, Philippines

² Professor, Gordon College, Olongapo City, Philippines

* Corresponding Author Email: ajmayorn@gmail.com

Abstract

Dengue has kept itself in the top ten diseases by number of deaths in tropical areas. Community preventive actions are the key to disease management according to the Health Belief Model (HBM). The present research used a descriptive quantitative method to study how respondents in the community of Rural Zambales (Philippines) perceived the different dimensions of HBM, involving 500 participants selected through purposive sampling who were given a standardized health-belief questionnaire. The result showed that the respondents had a high perception of severity, low perception of susceptibility, very strong signals for action, moderate self-efficacy, low perceived barriers, and high perceived benefits. Although participants considered dengue to be a very big health problem and they supported the preventive measures that were backed by environmental and informational indicators strongly, they failed to see that they could be the carriers of the virus and their beliefs in their capacity for consistent preventive behaviors were weak. It can be inferred that preventive action tends to be more a response to outside prompts and perception of benefits than the self-efficacy and internal assessment of risks of getting sick. That is why it will be important to make people more aware of their vulnerability as the ones that can become vectors, in addition to improving their behavioral confidence so that it will be easier for the community to maintain the existing dengue prevention strategies. Community interventions should therefore concentrate on increasing the people's perception of susceptibility and self-efficacy through methods like experiential learning, participatory education, and the use of local health institutions that have health departments and educational centers on the same premises. Changing these belief aspects can lead the community to translate information and positive attitudes into behavior that continues for long and can thereby reduce dengue transmission in the community through time. Public health campaigns will also help further by combining school-based activities, community-based initiatives, and family demonstrations to raise one's awareness of personal risk and practical mosquito-control measures. For a person living in such an affected area with dengue and having a mosquito around to change their cue response from transient behavior to a habitual one, the person has to be consistently encouraged through external factors as well as the person has to be able to see themselves as at risk and being capable through their own belief or strength. The study also shows that it is the combined effort of one's risk assessment through understanding of the disease and the ability of a person to make that a habit through belief that is going to result in the prevention efforts being effective even in places where dengue is more prevalent. The intervention plans of those affected places should include not only the distribution of educational materials but also make communication part of the educational package as an ongoing process with the local community. That will make it possible to obtain a sustainable result.

Keywords

Community behavior, Dengue prevention, Health Belief Model.

INTRODUCTION

Dengue fever is a viral illness transmitted primarily by mosquitoes and is characterized by the dengue virus. It is the most common illness transmitted to humans by mosquitoes after malaria, yellow fever, and Zika. The World Health Organization [1] estimates that over half of the global population lives in an area where they are at risk of dengue. The number of cases has a wide range, from 100 million to 400 million infections per year. It is found in tropical and subtropical areas where *Aedes* mosquitoes are predominant. Dense urban or semi-urban areas where environmental conditions help mosquito development are especially susceptible to dengue outbreaks. Although dengue can lead to symptoms as minor as fever and body aches, there are cases where the infection develops into dengue hemorrhagic fever

and severe complications such as dehydration and internal bleeding which require urgent medical treatment. The key is to diagnose it at the early stage and the only way that is effective against severe dengue is hospital care in a timely manner.

Dengue fever is a rapidly growing problem of concern to public health around the world. Outbreaks can cause a massive overload of the healthcare system and a major disruption of the economics. Climate change along with various other factors plays a big role in dengue by affecting viruses, mosquitoes, and the way of human living. Dengue viruses are endemic to over 100 countries, mainly in tropical and subtropical areas. In these areas it is very common and the fact that there is greater spread of the mosquito, the carrier of *Aedes aegypti* is one of the factors responsible that has pushed up the risk of dengue in other places.

Epidemics of diseases like dengue were first described in 1779 while the virus was officially discovered in 1943. Currently, dengue fever is present or has high risk of occurrence in more than 100 nations mainly in tropical and subtropical countries such as Southeast Asia, Africa, Western Pacific, and Americas. It is only occasionally found in certain parts of Europe like France, Croatia, Portugal, and Germany, as well as a few spots in America. The effects of climate change combined with a growing population; greater mobility of people and faster rates of urbanization are all projected to increase the dengue problem. One of the effects on endemic regions is an increase in risk and the secondary effect on the *Aedes aegypti* mosquito's range expansion will lead to the appearance of the main vector in new territories [2]. Dengue has placed a huge, severe and constantly expanding burden on countries in terms of high infection rates and severe disease that have led to the huge economic implications as well as swift changes in their geographical distribution. Earlier studies have shed great light on the dengue effect, but they also point out the existence of major gaps of information. At present there are several limitations, for example, outdated datasets, the most detailed estimates up to date are still a 2019 report; limited geographical scope such as focusing only on a single country or a region; using combined analytical methods to include different vector transmitted diseases to get dengue numbers etc. Furthermore, very few analyses of age, sex, and socioeconomic distribution patterns have been done which could help in identifying and comparing globally differences in burden distribution between those who are better off and the disadvantaged. The lack of a modern analytical study employing the same standard measurement units has prevented developing intervention strategies targeted to the real needs and thus left health systems without the necessary detailed information required to strengthen the methods of vector control, the delivery and management of dengue vaccines, and even the treatment of the disease [3].

Dengue fever is one of the severe issues among the people living in underdeveloped countries with a lack of sanitation systems. The fact that the healthcare infrastructure is not very developed also makes the case of dengue infection more problematic and life-threatening. The prompt response to dengue outbreaks is hindered by inadequate information exchange and integration. Although timely forecasts of dengue epidemics can mitigate their occurrence, most dengue prediction studies have mostly depended on data that impose considerable collecting constraints on specific countries [4]. Dengue-endemic nations frequently struggle to manage such surges, resulting in healthcare institutions becoming inundated during each dengue season. Moreover, while dengue was mostly a children disease historically, it now predominantly impacts adults in numerous nations, exhibiting increased incidence of severe illness and fatality rates among pregnant women and individuals with comorbidities. Given the absence of a specific treatment for dengue and the lack of early biomarkers to predict the

progression to vascular leakage, all dengue patients are meticulously evaluated for potential fluid management requirements. Moreover, diagnosing individuals with acute dengue is complicated by the resemblance of clinical symptoms in the early stages of the illness and the inadequate sensitivity and specificity of point-of-care diagnostic tests [5].

Dengue transmission is closely tied to ambient temperatures, and Southeast Asia remains a hyperendemic region in this regard. Incidence rates in Southeast Asia were much higher than in other parts of the world. Between 2001 and 2010, it is estimated that the region experienced a yearly average of 2.9 million dengue cases and 5, 906 related deaths. The economic burden resulting from the disease, which consists of direct costs of treating patients, costs of loss of productivity and large disability-adjusted life years demonstrate the enormous public health impact of the disease. Despite these facts, specific antiviral drugs haven't been obtained yet, and effective vaccines aren't widely available at this moment, therefore, dengue is still considered a serious threat [6].

Dengue is endemic to the Philippines, so the country has the highest dengue numbers, and the biggest cause of global dengue. Dengue is big deal in the country, with over one million dengue cases in the adjusted annual average. The reason the country has so much dengue transmission at different locations is mostly because it is not only a group of islands with an incredible number that are geographically quite far apart, but it also has varied climatic patterns and biological diversity. All these leads to a situation in which dengue infection is highly localized, making the implementation of dengue in control strategies really challenging. Philippines launched the National Dengue Prevention and Control Program (NDPCP), which will address the problem of decreasing dengue through the implementation of the following activities: surveillance, outbreaks, management, case diagnosis, health promotion advertising, vector control management, and research, but in order to reach such ambitions, timely surveillance has to be combined with the use of spatiotemporal analysis. However, there are still limits to the use of national spatiotemporal modeling of dengue incidence in the whole of Philippines [7].

The Health Belief Model (HBM) is an established theory widely used in health behavior research. This theory has proven to be useful in understanding the motivations behind a person's behavior, particularly regarding illness prevention, through the lens of HBM concepts. According to the theory, health behavior engagement depends more on psychological evaluation of risk and self-efficacy, rather than just being affected by objective risk only. The elements of perception include perceived vulnerability, perceived severity, perceived benefits, perceived barriers, cues to action, and perceived self-efficacy. Applying HBM frameworks in dengue prevention could help pinpoint the behavioral gaps and weaknesses. This theory highlights also the importance of psychological factors, structural barriers, behavior

reinforcement mechanisms besides mere dissemination of information for successful dengue control programs.

MATERIALS AND METHODS

In this study, a quantitative-descriptive research design was employed, anchored to the Health Belief Model (HBM) for its ability to predict changes in health-related attitudes and behavioral tendencies using health beliefs. In this setting that is a remote rural municipality in Zambales, Philippines, which was picked for this study, since its location presents quite similar situations for public health in geographically and socioeconomically similar areas, the research analysis was done. A total of five hundred participants were surveyed. The process of selecting individuals to participate in this study was carried out via purposive sampling, which was done for the sake of getting a sample population that would perfectly align with the research questions and the objectives of the study. The data of this research were gathered by means of a questionnaire based on the principles of the Health Belief Model. The questionnaire utilized in this study was developed and adapted as a research tool that was originally based on the Health Belief Model research conducted [8]. The measure assessed main aspects of health perception through perceived severity, perceived vulnerability, perceived benefits, perceived barriers, cues to action, and self-efficacy. These components were used to investigate respondents' attitudes and behavioral factors related to the health issue under study. Data was analyzed through descriptive statistical methods. Weighted mean was used to determine the central tendency of respondents' answers for each item, and composite mean scores were calculated to describe each construct of the Health Belief Model. The findings were interpreted using descriptive categories to better understand respondents' perceptions in all dimensions of the model.

RESULTS AND DISCUSSION

Table 1. Health Belief of the Respondents towards Dengue in terms of Perceived Severity of the Disease

Indicators	Mean	Descriptive Rating
1. I feel that dengue fever is very dangerous.	3.84	Strongly Agree
2. I do not think dengue fever can cause death.	2.10	Disagree
3. Dengue fever can occur without presence of skin rashes.	3.08	Agree
4. Continuous fever worries me.	3.71	Strongly Agree
5. Even though there are various medical facilities to treat me, I'm still afraid of dengue fever.	3.51	Strongly Agree
Overall Mean	3.25	Agree

The perceived severity construct reflects the extent to which one's mind (or cognition) and the heart (or feelings) can see a threat (a health problem) as a serious one and how much of it there can be. This paper showed that respondents had a high degree of perceived severity about dengue fever, with an overall mean score of 3.25 signifying agreement. It could imply that most participants viewed dengue as a dangerous and possibly lethal illness. High significant perceived severity as found in the paper is interpreted as respondents having a strong intellectual awareness of dengue as a serious public health problem. This resonates well with the Health Belief Model which states that perceived severity is considered as one of the motivating factors behind preventive behaviors especially when the two factors, believed susceptibility and potential benefits, are also present. A study done in Brazil using the Health Belief Model revealed that the perceived severity of the situation was mostly high, with nearly all the participants being aware that in some cases, dengue can develop into more severe and dangerous forms; however, preventive behaviors among this population were at times inconsistent and that severity perception although important was not enough for a change in behavior to be lasting [9]. Empirical evidence lately seems to suggest that the way one perceives severity is a function of being personally and/or indirectly exposed to dengue in the vicinity. In a report from Bangladesh, it was stated that individuals' fear of dengue getting severe related to their knowledge of possible complications and their peers' hospitalization experiences, which in addition caused a greater fear or anxiety in them [10]. A study in Malaysia, which used the adapted Health Belief Model as a framework, found a significant relationship between perceived severity and the understanding that dengue might even get to dengue hemorrhagic fever with deadly consequences [11]. Their findings therefore highlight that when people learn about the nature of an illness scientifically, it affects the way they mentally frame severity.

Table 2. Health Belief of the Respondents towards Dengue in terms of Susceptibility towards the Disease

Indicators	Mean	Descriptive Rating
6. I was very worried when to get bitten by a mosquito	3.26	Strongly Agree
7. I am not worried if there is a standing of water that is unnecessary outside my house.	2.05	Disagree
8. I can be infected with dengue fever.	3.29	Strongly Agree
9. If I'm healthy, I will not be infected with dengue fever.	2.28	Disagree
10. I was often bitten by mosquitoes but never fall sick. I thought I will not be infected with dengue	2.49	Disagree

	fever.		
Overall Mean		2.67	Disagree

Susceptibility or risk factor from the individual's own point of view or the degree to which disease acquiring is perceived by a person. It is a component of the Health Belief Model that has been identified as one major factor influencing health prevention behavior. That is why an individual is more likely to adopt protective behaviors if they really believe in their own risk. In this study, we found that the respondents had a low perceived susceptibility which was the overall mean of 2.67 that we interpreted as disagreement which means that respondents were aware of dengue fever as a health risk but still did not think that they were personally very susceptible. It has been reported in several literatures that perceived vulnerability is a variable of both prediction and protection of dengue that it can sometimes be paradoxical. One of the recent community based study in India in the year 2024 found that when perceived susceptibility was accompanied with perceived seriousness of the disease and was strongly correlated with behavioral intentions to prevent the illness, then the individual level of perceived susceptibility played a significant role in shaping intentions of taking preventive steps to avoid dengue infection, otherwise, the perceived susceptibility alone is not the factor to bring a behavioral change in the person [12]. From a cross-sectional survey of dengue Knowledge-Attitude-Practice in the Philippines, people showed dengue knowledge which could prevent them from transmission of dengue but at the same time they were still underestimating their risk when they did not see immediate surroundings which are threats like visible mosquito breeding, the study points out. This shows a mismatch between a person's understanding and the feeling of being vulnerable to dengue [9].

Table 3. Health Belief of the Respondents towards Dengue in terms of Cues to take Action against the Vector

	Indicators	Mean	Descriptive Rating
11.	I take precautions if my area is declared a hotspot area.	3.73	Strongly Agree
12.	I was often reminded to take implementation activities to control dengue fever.	3.43	Strongly Agree
13.	People around me do not carry out activities to control dengue fever.	2.56	Agree
14.	I will help my neighbors eradicate breeding spots if I see them doing so.	3.44	Strongly Agree
15.	Announcements of information about dengue interest me to	3.58	Strongly Agree

	take part in the control/ prevention of dengue.		
Overall Mean		3.35	Strongly Agree

Cues to action refer to internal or environmental stimuli that prompt people to take or sustain health-related actions. According to the Health Belief Model the cue to action is that element which turns health beliefs into actual, real-life preventative behaviors. Cues for action can include health education campaigns, mass media messages, community notifications, face-to-face interpersonal communication, and alerts about disease outbreaks. The results from the present study indicated that the subjects had a very high level of cue to action, with an overall mean of 3.35 which could be seen as "strongly agree". This implies that individual is very open to and susceptible to external information and the stimuli coming from the community regarding dengue prevention. The findings above show the role of these cues in motivating action towards dengue prevention and the importance of providing the community with these cues is also highlighted. The role of cues which motivate action in dengue prevention has been emphasized by a recent stream of literature, particularly in endemic areas with scarce resources. As per the research carried out individuals exposed to news about dengue either through health campaigns, school classes, or community notifications were more likely to clean their surroundings and adopt preventive measures like protection from mosquito bites [9]. The study pointed out that spreading knowledge was the main factor that made people in dengue-affected areas change their habits. In the context of behavioral psychology, cues prompting action are external factors that make people feel more urgent about something. Psychosocial drivers of infectious disease behavior models often include cues such as outbreak alerts and media reports that can be frequently integrated [13]. These psychosocial drivers were found to be the ones that mainly affected contact reduction and compliance behaviors, which, as a matter of fact, had a bigger impact than static cognitive factors like knowledge and attitude. Dependence upon cues for action could be a major reason why one is more inclined to take up dengue prevention in rural regions is not because it's habitual, but because it's a result of being prompted through communications. This aspect would certainly help the public health sector as it would mean that behavior change can be quick by means of information. On the downside, it would mean that preventive behaviors might fade away without being reminded of them frequently. Reviews of how the community is involved in fighting dengue highlight one of the limiting factors, and that is the lack of continued motivation and program fatigue, the results are that cue driven approaches to the intervention are only effective in the long term if they are integrated as part of schools, barangays, and health units [14].

Table 4. Health Belief of the Respondents towards Dengue in terms of Self-Efficacy

Indicators		Mean	Descriptive Rating
16.	I will ensure there are no breeding spots around my house.	3.53	Strongly Agree
17.	I felt that larvae elimination activities in residential areas should be left entirely to the government.	2.34	Disagree
18.	I do not think I played an important role in controlling dengue fever.	2.83	Agree
19.	I have sufficient knowledge on dengue fever.	3.10	Agree
20.	I do not know what information needs to be delivered to my family members about dengue.	2.27	Disagree
Overall Mean		2.81	Agree

Self-efficacy refers to the belief that one can accomplish certain health-related actions successfully. In the Health Belief Model, self-efficacy plays a very important role, and it is through this element that one's abilities to turn knowledge and belief into preventive behaviors consistently are measured. Results of this study indicate that most respondents had moderate self-efficacy, mean score 2.81 "agree. Thus, participants generally do believe they can perform dengue prevention behaviors, but their confidence level is somewhat low and inconsistent over different indicators of self-efficacy. Self-efficacy has also been identified by various studies as one of the most important factors in predicting dengue preventative behavior. A 2022 study done in Mexico found that self-efficacy greatly influenced people's decision to engage in mosquito control activities. Those who were more confident in their ability to eliminate breeding sites through regular preventative actions, were identified as people with a much greater self-efficacy level, thereby indicating self-efficacy as the main behavioral determinant in the prevention of dengue [15]. A research study in Southeast Asia, which employed the Health Belief Model, emphasized that self-efficacy, along with perceived threat and perceived rewards, together influence real action on prevention. It was noted in the study that individuals, even though they know the seriousness of a disease like dengue, their lack of belief that they can control the environment will lead them not to follow through on the right behaviors [16]. In the Philippines, studies examining dengue prevention behaviors reveal that mere knowledge is not sufficient unless individuals believe they are capable of taking preventive actions in their daily environment. Preventive measures include common activities such as sanitizing containers for water, keeping things secure, and organizing or participating in neighborhood clean-up campaigns. In a Health Belief Model study in Central Luzon released in 2024, findings showed the same thing: the combination of behavioral change interventions which have community and personal

elements can considerably improve self-efficacy. From the research it was clearly seen how hands-on participation works faster in building confidence as compared to informational approaches alone [9].

Table 5. Health Belief of the Respondents towards Dengue in terms of Perceived Barrier

Indicators		Mean	Descriptive Rating
21.	I felt that the government measures in controlling/preventing dengue are not effective.	2.44	Disagree
22.	I did not allow fogging in the house as it is hazardous to health.	2.39	Disagree
23.	The use of larvicide in the water can cause the water to become toxic.	2.73	Agree
24.	My family members are not interested when I shared information about dengue.	1.99	Disagree
25.	I have other important tasks that cause me unable to convey information about dengue to my family.	2.21	Disagree
Overall Mean		2.35	Disagree

Perceived barriers reflect an individual's evaluation of hindrances that hinder the adoption of health promoting behaviors. Perceived barriers in the context of Health Belief Model have often been considered as one of the determining constructs because of their direct obstruction of the transformation of the intention into a physical preventive act. However, a person's awareness regarding the disease's seriousness, vulnerability, advantages, and triggers to behave has been recognized. The current research showed that the participants hardly perceived barriers to their health behaviors since the general mean score of 2.35 corresponded to "disagree." Thus, it has been concluded that there are almost no barriers in the community's perception towards the role-play of individuals in combating dengue disease. The item-by-item analysis showed the respondents' personal and environmental views that still contribute to their actions. There is evidence in recent scientific literature that the main impediments of dengue control can be divided into several categories, such as not only the physical hindrance but also the social, informational, and psychological limitations. The main barriers related to dengue prevention were also outlined in the systematic review article, one of which is a lack of understanding about the effectiveness of vector control methods, doubt concerning the use of chemicals in control measures, and a belief that it is solely the government's responsibility to handle the prevention of dengue fever [14]. These results are very similar to the findings of the current

study, pointing to a long-lasting lack of accurate knowledge on larvicide use and intervention safety. An analytical review shows that people tend to seek healthcare in ways that confirm their preconceived notions, therefore, health-seeking behavior is a very good support of this understanding. It is also the case that people's understanding and awareness about the dengue disease do not automatically clear the perceived barriers they are facing if they have doubt about therapeutic efficacy or safety [17]. One of the recently done surveys, which was a part of community-based study, also shows how successful dengue control programs are in fact a product of overcoming the people's psychological barriers through education and engagement of the communities, especially, of the types that help to unravel the myths surrounding fogging, larvicide and environmental intervention strategies [18].

Table 6. Health Belief of the Respondents towards Dengue in terms of Perceived Benefit

Indicators		Mean	Descriptive Rating
26.	I will ensure my house area is free from breeding spots to avoid being penalized by the health authority.	3.54	Strongly Agree
27.	My participation in control/prevention activities can help in controlling dengue.	3.59	Strongly Agree
28.	Fogging can control dengue fever.	3.34	Strongly Agree
29.	If I disseminate information, I was able to save someone else from getting dengue.	3.50	Strongly Agree
30.	Each house should have at least one knowledgeable person about dengue fever to prevent the disease occurs among family members.	3.64	Strongly Agree
Overall Mean		3.52	Strongly Agree

Benefit perception reflects a person's belief in the effectiveness of a recommended health intervention in decreasing disease risk or severity. According to the Health Belief Model, such advantages serve as motivators, driving people towards and maintaining preventive health behavior even when there are competing beliefs or limitations. Participants in the current study reported a clear understanding and appreciation of benefits, with a total average score of 3.52 interpreted as "highly agreeing". This means the community is convinced that taking dengue prevention is effective at preventing the disease and at protecting one's family and community health through the measures. Several studies have demonstrated through time that perceived benefits are among the top predictors of

engaging the community to implement dengue control activities, especially within communities at risk for the disease and having limited resources. People who saw the effectiveness of mosquito repellents, cleanliness as an essential factor of environmental conditions and protective gear were more likely to undertake preventive actions. The results revealed that perceived benefit played the role of mediator in the process from knowledge to behavioral change [12]. Perceived benefits are the reason a person acts in the health behavior change process according to the Health Belief Model. People are more likely to take steps for health improvement when they believe advantages they are going to gain if doing so would outweigh disadvantages or when a perceived disadvantage is small and a perceived prompt is strong. Results show that respondents have a strong belief system of both cognitive and social aspects related to dengue prevention. They are ready to get involved in prevention behaviors, even if there is behavioral inconsistency because of factors working together at the same time including: the advantages that one expects to get, self-efficacy and the one's ability to perceive the problem (susceptibility).

CONCLUSION

The analysis points to the fact that most participants see dengue fever as a serious ailment and strongly believe in the merits of preventative measures that have environmental prompts of action repeated. However, their belief in the likelihood of being affected is low and their belief in themselves is only moderate, which means they are not fully aware of their personal risks, and they are insufficiently confident in following preventive procedures on a regular basis. Though seeing few barriers, it is quite possible that preventive actions are not performed regularly, as awareness is not translated into personal engagement. Dengue precautionary behavior appears to be mainly shaped by knowledge and external stimuli rather than by a well-integrated perception of risk and solid trust in behavioral control, which calls for boosting the sense of vulnerability and capability as the main drivers to promote the use of consistent preventive measures.

REFERENCES

- [1] World Health Organization. (2025, April 18). Dengue and severe dengue. <https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue>
- [2] Paz-Bailey, G., Adams, L. E., Deen, J., Anderson, K. B., & Katzelnick, L. C. (2024). Dengue. *The Lancet*, 403(10427), 667 to 682. [https://doi.org/10.1016/S0140-6736\(23\)02576-X](https://doi.org/10.1016/S0140-6736(23)02576-X)
- [3] Zheng, J., Hai, T., Chen, M., Duan, L., Song, P., Sun, J., Zhou, X., & Feng, X. (2025). Global burden of dengue from 1990 to 2021: A systematic analysis from the Global Burden of Disease study 2021. *Infectious Diseases of Poverty*, 14(1), 105. <https://doi.org/10.1186/s40249-025-01365-x>
- [4] Kuo, K.-T., Moukheiber, D., Cajas Ordonez, S., Restrepo, D. S., Rahman Paddo, A., Chen, T.-Y., Moukheiber, L., Moukheiber, M., Moukheiber, S., Purkayastha, S., Kuo, P.-C., & Celi, L. A. (2024). DengueNet: Dengue prediction using

- spatiotemporal satellite imagery for resource-limited countries. arXiv. <https://arxiv.org/abs/2401.11114>
- [5] Malavige, G. N., Sjö, P., Singh, K., Piedagnel, J.-M., Mowbray, C., Estani, S., Lim, S. C. L., Siqueira, A. M., Ogg, G. S., Fraisse, L., & Ribeiro, I. (2023). Facing the escalating burden of dengue: Challenges and perspectives. *PLOS Global Public Health*, 3(12), e0002598. <https://doi.org/10.1371/journal.pgph.0002598>
- [6] Weng, S. L., Hung, F. Y., Li, S. T., Liou, B. H., Yeung, C. Y., Tai, Y. L., Wu, Y. H., Huang, Y. N., Chiu, N. C., Lin, L. Y., Chi, H., & Lin, C. Y. (2025). Dengue epidemiology in 7 Southeast Asian countries: 24-year, retrospective, multicountry ecological study. *Interactive Journal of Medical Research*, 14, e70491. <https://doi.org/10.2196/70491>
- [7] Olana, K. O. A., Thongprachum, A., Poprom, N., & Punyapornwithaya, V. (2026). Spatiotemporal clusters and dengue hotspots in the Philippines: A nationwide analysis spanning 2017 to 2024. *Frontiers in Public Health*, 14, 1781800. <https://doi.org/10.3389/fpubh.2026.1781800>
- [8] Othman, H., Zaini, Z.-I. I., Karim, N., Abd Rashid, N. A., Abas, M. B. H., Sahani, M., Hod, R., Daud, F., Nordin, S. A., & Mohamed Nor, N. A. (2019). Applying health belief model for the assessment of community knowledge, attitude and prevention practices following a dengue epidemic in a township in Selangor, Malaysia. *International Journal of Community Medicine and Public Health*, 6(3), 958–970. <https://doi.org/10.18203/2394-6040.ijcmph20190578>
- [9] Gregorio, E. R., Takeuchi, R., Hernandez, P. M. R., Medina, J. R., Kawamura, S., Salanguit, M. B., Santillan, M. D. C., Ramos, K. M. S., Tuliao, G. J., Morales, L., Palatino, M., Shibuya, F., & Kobayashi, J. (2024). Knowledge, attitudes, and practices related to dengue among public school teachers in a Central Luzon Province in the Philippines: An analytic cross-sectional study. *Tropical Medicine and Health*, 52, Article 25. <https://doi.org/10.1186/s41182-024-00591-7>
- [10] Siddique, A. B., Omi, N. T., Rasel, S. M., et al. (2024). Assessment of perceived dengue risk and prevention practices among youth in Bangladesh. *Scientific Reports*, 14, 3940. <https://doi.org/10.1038/s41598-024-54238-y>
- [11] Zamzuri, M. A. I. A., Abd Majid, F. N., Dapari, R., Hassan, M. R., & Mohd Isa, A. M. (2022). Perceived risk for dengue infection mediates the relationship between attitude and practice for dengue prevention: A study in Seremban, Malaysia. *International Journal of Environmental Research and Public Health*, 19(20), 13252. <https://doi.org/10.3390/ijerph192013252>
- [12] Narendran, M., Chate, S., & Patil, R. (2024). Community-based intervention to dengue prevention: Insights from urban residents in Pune, using the health belief model. *Clinical Epidemiology and Global Health*, 30, 101779. <https://doi.org/10.1016/j.cegh.2024.101779>
- [13] Jo, Y., Sharbayta, S. S., & Buonomo, B. (2026). Behavioral change models for infectious disease transmission: A systematic review (2020 to 2025). arXiv. <https://doi.org/10.48550/arXiv.2602.16633>
- [14] Naing, C., Htet, N. H., Tung, W. S., Aung, H. H., & Whittaker, M. A. (2023). Facilitators and barriers to engaging communities in health service research on dengue control in Indo-Pacific region: A systematic review. *BMC Public Health*, 23, 1924. <https://doi.org/10.1186/s12889-023-16845-8>
- [15] Annan, E., Angulo-Molina, A., Yaacob, W. F. W., Kline, N., López-Lemus, U. A., & Haque, U. (2022). Determining perceived self-efficacy for preventing dengue fever in two climatically diverse Mexican states: A cross-sectional study. *Behavioral Sciences*, 12(4), Article 94. <https://doi.org/10.3390/bs12040094>
- [16] Guad, R. M., Carandang, R. R., Solidum, J. N., Taylor-Robinson, A. W., Wu, Y. S., Aung, Y. N., Low, W. Y., Sim, M. S., Sekaran, S. D., & Azizan, N. (2021). Different domains of dengue research in the Philippines: A systematic review and meta-analysis of questionnaire-based studies. *PLOS ONE*, 16(12), e0261412. <https://doi.org/10.1371/journal.pone.0261412>
- [17] Ng, T. C., Teo, C. H., Toh, J. Y., Dunn, A. G., Ng, C. J., Ang, T. F., Abdullah, A., Syed, A., Lim, H. M., Yin, K., & Liew, C. S. (2022). Factors influencing healthcare seeking in patients with dengue: Systematic review. *Tropical Medicine & International Health*, 27(1), 13 to 27. <https://doi.org/10.1111/tmi.13695>
- [18] Arfan, I., Sulistyorini, L., Sulistyowati, M., Syahrul, F., Junaidi, H., & Rizky, A. (2024). Benefits and barriers of community participation in dengue control: A systematic review. *African Journal of Reproductive Health*, 28(10s), 482 to 498. <https://doi.org/10.29063/ajrh2024/v28i10s.49>