

A STUDY ON COMMUNITY'S PERCEPTIONS OF FOGGING AS A MEANS TO CONTROL DENGUE INFECTION IN BANDUNG, WEST JAVA, INDONESIA

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INTRODUCTION

Dengue fever has become amongst the most pertinent infectious diseases in the world and it is getting more relevant in the current global development (Huntington et al, 2016; Bhatt et al., 2013). Unlike other neglected tropical diseases, dengue fever has found a resurgence during the past decades in both developed and developing countries (Suwandono et al., 2006; Karyanti et al., 2014), particularly due to changes in urban lifestyles, the rate of international travels, and the shift of focus in governments' health policy from infectious diseases to non-communicable diseases (Gubler, 2014).

As a disease that requires community involvements in its prevention and control (Sumarmo, 1992; Elsinga et al., 2017), understanding how people perceive dengue, its vector, and its ways of controlling it becomes critical. Government programs to increase community participation have often been hindered by the lack of awareness and receptiveness of the community towards novel ways of controlling dengue vector (Faridah et al., 2017). One particular case is fogging. Although this method has been implemented for years in Indonesia to prevent dengue infection at the community level, the Ministry of Health has recently revisited this method on the basis of its measurable disadvantages, including its costs, time, labor, and effects on mosquito resistance (Sumarmo, 1992). New alternatives have now been offered, but it is up to the community to accept and participate with these measures.

One issue to raise in this respect is that fogging has long been a central way of controlling dengue vector in communities in many countries in such a way that detaching the idea of fogging from dengue control has been challenging (Suwanbamrung et al., 2011). This study therefore aims to investigate factors that underlie community's perceptions of fogging as a means to control dengue infection and that will enable a shift in attitude towards alternative means of dengue control.

METHODS

Sampling locations

The survey was made as part of a community engagement program in Sekepicung, one of many peri-urban areas north of Bandung, West Java province, Indonesia (Figure 1). The site was chosen conveniently on the basis of previous studies made in the location for various aspects of community health (see e.g. Dwiartama & Suheri, 2016; Dwiartama et al., forthcoming). Sekepicung

is a kampong (lower than sub-district) with a population of 2,820 residents, half of the population are at their productive ages (between 17-45 years old). Most of the population works in the private, service sector (restaurants, hotels and golf courses). The average household consists of four members (parents and two children) (Dwiartama & Suheri, 2016). Although dengue incidence is relatively lower in the area than elsewhere in the municipality, a depiction of the community's response to dengue control measures will also provide insights to similar other cases. We invited 50 people who represented various layers of the community (elders, youth, housewives) to attend a counseling session and asked their willingness to participate in a quantitative survey and focus group discussion.

Instruments, data collection and analyses

There were two instruments for data collection. We started with administering validated questionnaires consisting of 41 questions that were divided into three parts: (1) socio-demographic characteristics (age, gender, education, occupation) (eight questions); (2) knowledge, attitude and practice (22 questions); and (3) pre-counseling test on knowledge and perception towards dengue control measures, particularly fogging and larvicides (11 questions). We then conducted a focus group discussion (FGD) within the topic of dengue prevention measures. Lastly, we administered a follow up post-counseling test with the same questions as those used in the third part of the questionnaire. Prior Informed Consent of the participants was taken after explaining the purpose of the study and knowing their willingness to share the information. Questionnaire data were recorded and visually analyzed using Google Form Application, whereas qualitative FGD data were coded using NVivo Qualitative Data Analysis software.

Ethics

This study has been approved by the ethics committee of Universitas Padjadjaran with the ethical clearance registration number 071711.

RESULTS AND DISCUSSIONS

Out of the 50 people that were invited, 32 attended the session and 27 were willing to participate in the pre-counseling quantitative survey. During the FGD, at least half of the participants were actively stating their knowledge, attitude and practice towards dengue control measures. After FGD was conducted, we obtained 19 responses from the post-counseling test.

Demographic data shows that the session was attended by participants with age ranging between 21 and 59 years old, 74% of whom were women. A majority of them was married with one child under 16 years old. Most of the participants (55%) worked as housewives and 24% were employees in the private sector, thus similar to the demographic profile of the area. Education levels were varied, with junior and senior high school graduates covered 55.5% of the participants. Almost half of the participants have an income level between US\$ 2 and 6/day, while a quarter lives below US\$ 2/day.

In terms of basic knowledge on dengue, a little more than 55% mentioned that they never had any of their families, neighbors and relatives being infected by dengue, but a majority knew what dengue hemorrhagic fever (DHF) (as well as the vector) nonetheless. More than 88% have never been involved in a DHF counseling in the past year, and so most of them acquired information about dengue from television and their neighbors/relatives. A large proportion of the participants agreed that garbage (such as tires, water bottles, and cans) is a potential breeding site for *Aedes* mosquitoes (81.5%), but the number seems lower for other potential sites such as bathtub, water container and ditches (lower than 37%). Two of the most DHF symptoms (high fever and red spots on the skin) were scored highest in the knowledge section (70.4% and 74.1%, respectively). In response to our question on recalling the intensity of mosquito bites in a day as well as presence of mosquito larvae in their neighborhood, most of the participants could not seem to remember. Aside from individual prevention measures, more than 60% of the participants agreed that two of the most pertinent collective actions that the community is able to do to prevent dengue infections were collective environmental cleaning (which they did regularly) (61.5%) and fogging (46.2%), although 78% of the respondents admitted that they never had any fogging in the last six months. Only half of the participants knew about larvacide prior to the counseling, and the most known larvacide was Themephos (65.4%), which information they acquired from television advertisement and posters on the public health center, although strangely 54.2% claimed that they could access the larvacide easily from traders coming to their houses.

During the group discussion, participants elaborated on the reasons behind their choice of fogging as the main solution for dengue prevention measures. A limited information on alternatives to dengue control was one aspect. They agreed that if there were other alternatives to dengue control measures, then they would have chosen the other rather than fogging. The discussion substantiated their survey responses on why they do not prefer fogging: the odor, potential breathing problems, and effect of leaving oily substance on their food, plates, cups and housewares were the main reasons. However, they do

believe that fogging can reduce the number of mosquitoes significantly. One local official admitted that during previous dengue incidence, she (using an official fund) deliberately bought a fogging machine to be used should there be any other incidence in the future.

Lastly, a post-counseling test using the same questions revealed their change of knowledge and attitude towards fogging and another alternative to it. Almost 90% of the participants now knew about *Bacillus thuringiensis* larvacide as a control alternative, 85% believed that there are other ways of controlling dengue aside from fogging, and an almost unanimous (97%) call that BT larvacide is definitely better than fogging, with the main reason being safety.

Although only 64% of the invited community members did attend the counseling, 84% of those who came were willing to participate in the survey and 59% of the participants were willing to fill in the post-counseling test, showing a modest rate of response. The counseling was targeted towards a good proportion of community members, with housewives being the highest, showing their active involvement in the family and community health programs. This is particularly important since these housewives were the one responsible to take care of their family.

We found that information about dengue infection and prevention measures is particularly critical to the success rate of dengue control. Considering the fact that the community acquires information on dengue only partially and one-sidedly through television (with which communication and feedback cannot be obtained), it is understandable that their knowledge of dengue (mosquito breeding sites, symptoms, individual prevention, and collective prevention measures) seems to be partial. This can contribute to a false understanding of dengue and ways to control it.

Another important finding was their attitude towards dengue. In other communities, fogging is seen to be the main solution for mosquito eradication, saying that people will not be satisfied if no fogging is done after a reported incidence, regardless of the result (Suwanbamrung et al., 2011). This study reveals that the reason for the participants was not because they are psychologically attached to fogging, as other studies suggest, but because they do not have other control options at the table. Easy access to facilities such as fogging machines, diesel and insecticide also contributes to the situation, which will have the potential to hinder the Ministry of Health's program to opt out of fogging. This, on the other hand, also shows an active participation of the community to control the spread of dengue, in opposed to awaiting government's response. Both central and local governments should see this opportunity to facilitate local communities with alternative means of controlling dengue that can be proven effective and socially and environmentally acceptable.

CONCLUSION

This study concludes with a finding that community awareness of fogging and other alternative means of dengue prevention has been promising in support of government's attempts to phase out of fogging. A comprehensive and reliable information about dengue should also be delivered so that the community can actively decide on the best way of anticipating dengue incidence and controlling mosquitoes and their breeding sites in the neighborhood.

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