

Original article

Community capacity domains of dengue prevention and control

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Abstract

Objective: To explore the meanings and domains for giving communities the capacity to be successful in dengue prevention and control. **Methods:** One hundred and twenty participants were purposely selected from 4 sub-districts of 4 provinces in Southern Thailand with a high dengue incidence. Sixty community leaders and sixty non-community leaders participated in this study. In-depth interviews (IDIs), as well as focus group discussions (FGDs) with tape-recorders and note-taking, were used to collect data. All records were transcribed verbatim and analyzed by using the Colaizzi method for content analysis. **Results:** The findings showed that people view the creation of a sustainable dengue community program as possible only with the support of each community in its entirety: "everyone, every sector, all participating, and with continuing activities." Community capacity for dengue prevention and control was dependent on ten domains: 1) stakeholder participation, 2) community leadership, 3) a core-activities group, 4) a problem-solving needs assessment, 5) dengue information transfer, 6) resource mobilization, 7) a sense of community for the dengue problem, 8) a dengue network partnership, 9) critical dengue situation-management, and 10) continuing dengue prevention and control activities. **Conclusion:** These community capacity domains can be developed into an assessment tool for the community capacity-building process. Community capacity domains require community leaders and non-community leaders to clarify dengue prevention and control assistance required.

Keywords: Community capacity domains; Dengue; Thailand; Qualitative study

INTRODUCTION

Dengue actually causes several diseases, of varying severity: uncomplicated dengue fever (DF), dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS)^[1,2]. There is no specific treatment for

infection, and preventive vaccines, while under development, are not yet available. Chemical insecticide application has been ineffective as a method of elimination for adult vectors. The lack of efficacy of the chemical insecticide approach led to a policy aimed at the prevention and control of epidemic dengue^[3,4]. Environmental changes, particularly those related to climate, directly affect the incidence and prevalence of most vector-borne diseases. Moreover, social factors, such as lifestyles and population density, particularly in the case of dengue, are also important^[5,6]. Consequently, dengue is viewed as a community problem and it thus requires a community

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solution, which may consist of such domains as creating an understanding of its epidemiology, taking flexible approaches, maintaining the process of prevention and control, and combining health-promotion approaches in order to change human behavior. The prevention and control of dengue infections in the community, or community-based intervention, is the only currently available option^[1,7].

Community-based dengue prevention and control involves many factors, such as setting, targets, agents, and resources for intervention^[8]. It is, in this context, defined as a strategy consisting of two groups for dengue prevention and control. The first group is community leaders as the "capacity-building group," which consists of representatives of dengue health promoters, local authority/organization networks, schools, temples, and village health volunteers. The second group is non-community leaders as the "sustainable prevention and control group," which consists of community members who serve as family health leaders^[1,9]. Both groups have differences in their demographics. In communities that suffer from the dengue problem, community-based activities are necessary for sustainable dengue prevention and control.

Sustainability has become one of the most critical concepts for dengue prevention and control. It means the existence of an adaptive prevention system, with continuous innovation, that can be integrated into ongoing operations to benefit diverse stakeholders^[10]. Sustainability is a continuing challenge and a major issue, and must be defined according to the characteristics of each specific setting^[5,11]. One of the bridges to effective prevention and control is a basic adaptability, both of control programs to the mosquito's changing behavior, and of education programs to public, regional and local particularities. Other bridges include transdisciplinary, community-based, intervention; the ability to apply the lessons of local situations at a higher level; and the capacity to learn from experience to achieve sustainability^[3,5,6,12-14]. Most importantly, the ability of the community (people, groups, and organizations) will be the driving force for the development and maintenance of an effective and sustainable program^[5].

Community capacity building is not only concerned with the large-scale prevention and control of communicable diseases, but is also focused on individual protection within communities^[15]. It is addressed in terms of community participation, community intervention, and community-based approa-

ches, all of which should be multidisciplinary^[16]. Consequently, community capacity building is an intervention process which increases a community's capacity. This process involves four sub-dimensions: (1) preparation by defining domains and developing the assessment tool, (2) assessment of domains, recording, and analyzing, (3) developing a strategic plan and implementation and (4) follow-up and re-assessment with the same assessment tool^[17,18].

Concerning the domains of community capacity, this study proposes ten domains that have emerged from an extensive literature review, and which include participation, leadership, community structure, needs assessment, information transfer, resource mobilization, senses of community, network partnerships, critical assessment, and program management^[9,18-21].

Consequently, community capacity for sustainable community-based dengue prevention and control is defined as a set of characteristics of community activities aimed at the prevention and control of dengue. Relating to the dengue problem and solutions, these activities must define, analyze, implement, and evaluate, using the community as setting, and community participants as targets, agents, and resources of intervention. These domains of community capacity are based on situations or areas^[8,17,19-25].

The National Dengue Control and Prevention Program in Thailand has endorsed community-based control programs by encouraging residents to take responsibility for control activities in their households. However, dengue prevention and control activities have not had much impact in reducing dengue transmission at the national level, as has been seen in Southern Thailand. It is at high risk for dengue incidence because of several regional factors, such as more rainy days, greater total rainfall, higher average relative humidity, and warmer temperatures than in other parts of the country^[26]. Therefore, people need a better understanding of prevention and control of the disease, and continuing community participation is an important issue^[27-29]. Few studies have explored the concept of a sustainable, community-based, dengue prevention and control program in Thailand.

A community, and its involved personnel, needs to assess its capacity; what is appropriate and what domains for sustainable dengue prevention and control need to be created or improved? With the goal of conducting an appropriate community capacity-building program for sustainable community-based dengue

prevention and control, this study seeks to explore the meanings and domains of community capacity for dengue prevention and control.

MATERIALS AND METHODS

Study design

This qualitative study employed dynamic processes, including literature reviews, a field study involving individual interviews (IDIs), focus group discussions (FGDs), assessments of secondary data, and content analysis using the Colaizzi method^[30].

Study sites

The researchers decided to limit the study into only the southern part of Thailand, where the dengue disease burden is the greatest. In this area, the median morbidity rate over the past ten years (1997 – 2006) was 88.88 per 100 000 people, and the mortality rate was 0.19 %^[31]. In Thailand, sub-districts consist of villages or small communities. The sub-districts are grouped into districts, and the districts into provinces. Sub-districts are communities where contributing needed resources, providing community safety, insuring a dependable water supply, maintaining adequate sanitation, and having effective solid waste management must all occur. The purposive selection criteria numbered three. The first was a sub-district widely recognized as a high-risk area for dengue infection over the past five years (2003 – 2008)^[32,33]. The second selection criterion was a sub-district where community members had engaged in previous dengue prevention and control activities. The final criterion was a community where members were available to help conduct research. The four sub-districts in this study were located in Nakhon Si Thammarat Province, Krabi Province, Songkhla Province and Trang Province.

Participants and selection criteria

The study focused on people in sub-district communities where dengue intervention programmes are trying to bring about behaviour change. The first group was labeled the "capacity for delivery and building group." It consisted of representatives of local administrative organization officials, school teachers, formal community leaders, and religious leaders. Further criteria were that members of this group had to have resided in the community for more than one year, be eighteen years of age or older, have fluency

in the Thai language, and be available to participate in the study. The second group, with non-community leaders, was the "sustain dengue prevention and control group." The participants in this group were representatives of households in the community, meaning they were involved with dengue prevention and control activities for their households, and were also used in the focus group discussions. The same inclusion criteria were used for this group as for the first group.

Questionnaires guideline

The question guidelines were based on the literature review of dengue as a public health problem, the sustainability of community-based dengue prevention and control, and domains of community capacity for this sustainability. The question guidelines for the focus group discussions and in-depth interviews were examined by three experts who reviewed them for content validity. The first section consisted of open-ended, semi-structured interviews, and was employed to explore the participants' concepts and understanding of sustainable dengue prevention and control. Another section was concerned with expanding community capacity domains, and was designed to reflect opinions and assumptions about the domains: participation, leadership, community structure, needs assessment, information transfer, resource mobilization, a sense of community, network partnership, critical assessment, and program management. The data-collection approach was informal, facilitating the open expression of views and ideas among participants.

Data collection

The study was approved by "The ethical review committee for research involving human research subjects, health science group, Chulalongkorn University." The primary phase of the research was conducted, reviewed, and analyzed from December 2007 to May 2008. The specific mixture of methods was selected in order to better understand the diversity of community dynamics within the overall qualitative approach, as well as to promote rigor through triangulation^[30]. The data collection methods used included IDIs, FGDs, and secondary data analysis, as explained in the following paragraphs.

IDIs

This study elicited detailed information about people's perceptions of the dengue problem, possible solutions, components of community capacity, and do-



mains for sustainable dengue prevention and control in communities. The IDI technique involved participants and researchers talking about dengue issues. The conversations generally lasted from 45 – 60 mins, depending on the content. The researchers prepared question guidelines and an audio recorder, and set a time and place where participants felt comfortable and where transportation was available. The researcher in the study started each interview by introducing herself and obtaining permission from the participants to allow recording of the conversation.

FGDs

FGDs were used to obtain information about people's feelings, opinions, perceptions, insights, beliefs, misconceptions, attitudes, as well as the receptivity of a group of people to an idea. The sampling technique included family members of households in the target communities who were available for discussion. Groups were rather small and usually included fifteen people. All participants in each group were invited by the researcher one week before the session. In each instance, the researcher introduced herself to the group and invited members to introduce themselves. Then the researcher provided the objectives of the study, obtained informed consent, discussed the focus group process, and obtained permission to audio record the session. To foster a flexible climate for discussion, the conversations were held in the local language, and lasted between 90 mins to 120 mins.

Secondary data assessment

Dengue is a complex problem because it involves entomology, epidemiology, and socio-ecological components. Therefore, secondary data collection for communities involved rates of dengue incidence, entomological surveillance, and information about previous or current dengue intervention programs. Dengue statistics for the current and previous five years, details of dengue interventions, implementation in the communities, and the results of dengue programs were all collected from health centers and local administrative organization officers.

Data analysis

The technique of content analysis was used in the study^[34]. It was a continuous, dynamic process that had to be integrated into the collection and coding of data, as well as the literature review. After data collection, the researcher made a complete recording, with a file note. All data from the IDIs and FGDs were tape-recorded, DVD recorded, and given a

field note. The process of content analysis consisted of three main steps: reviewing the data set, coding and categorizing words into categories based on meaning, and setting contextual themes for the meanings^[30,35]. The result was that the key concepts were organized into domains of community capacity for dengue prevention and control. At the end of the study, the researcher presented the results of the content analysis to eight community members from four sub-districts so they could review the interpretation of the results, as part of the member's review process.

Trustworthiness

The eight community members from the sub-districts added credibility to the study, as these stakeholders had the opportunity to examine categories, interpretations, and conclusions for real-life validity. This technique is the most important one for establishing such a study's credibility^[30]. Thus, all participants were asked to validate the common concepts and the general description of the two groups' experiences after the preliminary interpretation. Two members from each sub-district were asked to serve as peer debriefers to provide feedback on the credibility and appropriateness of the study's findings.

RESULTS

The 120 participants in this study were divided into two groups of four sub-districts. The community leaders group included 60 participants who were questioned with IDIs. The 60 non-leaders group was questioned using eight FGDs. Participants ranged from 18 to 80 years of age, with an average age of 43.2 years (SD = 10.9). The average time participants had lived in their communities was 37.2 years (SD = 15.7). Concerning the demographics of the participants, 65.8% were female, 63.3% Buddhist, 91.7% married, 36.7% had at least an elementary education level, and 39.2% worked primarily in agriculture. Half of all participants were villagers without leadership roles, while the community leaders group constituted the other 50%. The results defined meanings and identified the domains of community capacity for sustainable community-based dengue prevention and control.

Meaning of community capacity for sustainable dengue prevention and control

Different participants may naturally have differences of opinion. The study allowed individuals to participate, discuss views, and interact with others. According to the data analysis, all participants were in agreement that "everyone, every sector, all participating, and with continuing activities" should be the vision for the community capacity program. Everyone and every sector mean that all stakeholders in all places must contribute to facilitating and supporting sustainable dengue prevention and control. Continuing activities means that activities or strategies for dengue prevention and control must be ongoing and routine.

Domains for community capacity for sustainable community-based dengue prevention and control

A series of ten core opened-ended, semi-structured, questions was asked to the participants. The results confirmed that the concepts gleaned from the literature review were related with the themes (or domains) of this study. The ten domains to achieve sustainable community dengue prevention and control were identified as follows: community participation, community leadership, a core dengue activities group, a problem-solving needs assessment, dengue information transfer, a sense of community awareness of the dengue problem, a partnership network, critical dengue situation management, and continuing dengue prevention and control activities.

Stakeholders participation

Participations of all stakeholders were considered a vital characteristic of dengue prevention and control in the community. It was divided into two distinct groups. The "capacity for delivery and building group" consisted of dengue health promoters (implementing the dengue program), local authorities, and local organizations. The "capacity to sustain dengue prevention and control group" was the other group, as described earlier. All participants of dengue prevention and control in the communities, in both groups, were involved in defining, planning, implementing and evaluating activities.

Community leadership

Leadership by community members was defined as a skill of certain people in communities which allowed them to lead other members of the communities. In this study, the traits of an effective community leader were supporting others, dealing with conflict, acknowledging and encouraging community members to voice their opinions, creating strategies, sharing leadership, trusting, modeling, bringing people with

diverse skill sets together, and facilitating usage of community resources.

Core dengue activities group

Core dengue community groups were defined as groups of at least two people, and were divided into the "capacity for delivery and building group" and the "ability to sustain dengue prevention and control group." These two core groups consisted of formal community leaders, school teachers and students, health workers, village health volunteers, local administrative officials, and villagers. Health workers and local administrative officials were already involved in planning, coordinating, and facilitating functions in the effort to eliminate the dengue problem. However, communities need more robust policies and guidelines, and community laws, for managing dengue outbreak. Village health volunteers were the most important core group for the launching of the anti-dengue campaign, serving in its main roles and functions.

Dengue problem-solving needs assessment

Community needs assessment was defined as the capability of a community's members to identify the causes of the dengue problem, potential solutions to the dengue problem, and needed actions by the community to resolve the problem. The needs assessment was determined by making requests, asking questions, discussing ideas, and holding a community meeting.

Dengue information transfer

Dengue information transfer was defined as the process of thoroughly communicating dengue-related information to communities to create, develop, exchange, and use such information. Recipients would be both people and groups inside and outside of the communities. The important attributes of dengue-related media were types of channels, sources of information, frequency of announcements, types of content, and groups of recipients. Dengue information channels should include posters, brochures, telephone calls, community meetings, postcards, broadcasts from community dorms, and radio station broadcasts. The contents should concern important situation needs, dengue surveillance, dengue infection cases, dengue death cases, methods for dengue solutions, and disease monitoring. Announcement frequencies should be weekly, monthly, or yearly. Dengue information transfer should involve information about entomology, epidemiology, ecology, and sociology.

Resource mobilization

Resource mobilization was defined as the ability of a community to mobilize a variety of resources, such as local policy resources, human resources, financial resources, and health resources. Resource mobilization aids participants in sharing materials and finances for fogging and for using Temephos sand granules. Moreover, villagers can mobilize their labor resources to better survey and destroy mosquito breeding containers, launch dengue campaigns, and find personal protection for family members. Better mobilization can improve both the quantity and quality of resources for dengue prevention and control.

A sense of community for the dengue problem

A sense of community was defined as sharing community values and building and achieving trust among others. Participants explained sense of community as the degree of positive response to ameliorating the dengue problem, community creation, reinforcement of local ownership, and the changing of household-level behaviors, such as the elimination of mosquito breeding sites and the reduction of potential breeding water-containers.

Dengue network partnerships

The dengue network partnerships were defined as the necessary relationships between groups and organizations within a community or network for building the capacity of community-based dengue prevention and control. Community network partnerships included relationships between such groups as local politicians, public health units, schools, and parents. In addition, the network partnerships were also involved with receiving support from outside of the community group, e. g. from district public health centers, province public health centers, and the Ministry Public Health Center itself.

Critical dengue situation management

Critical dengue situation management was defined as the ability of a community to evaluate critical stages when there is a dengue fever case in the community. Communities must develop the appropriate personnel and social structures for dengue intervention strategies. The capacity of critical management was judged as the ability of a community to identify and solve problem activities for both persons and groups in the sub-district as soon as possible. Techniques included surveillance of the disease, defining and destroying breeding places and containers, and quickly fogging and using Temephos sand granules. Moreover, non-community leaders were trained to alert health centers or doctors when they or their family members showed any trace of the disease, inclu-

ding mere fever symptoms. The villagers were thus trained to solve the dengue problem in their sub-district by themselves.

Continuing dengue prevention and control activities

Continuing program management was defined as the ability of communities to manage dengue prevention and control activities in the sub-district areas. It was reviewed for effectiveness of planning, implementation, evaluation, finances, administration, reporting, and conflict resolution. Participants must continually conduct certain activities, which should be integrated into routines for the dengue program management to oversee. Participants also clarified the roles and responsibilities necessary for dengue prevention and control.

DISCUSSION

The main strength of the research approach was that it allowed the researchers to build the domains from the participants' perspectives. Many participants involved in the study group were long-time community members. The mean time among participants for living in these communities was 37.2 years. The methodological approach, question guideline development, triangulation of data collection, and content analysis were all conducted with joint review, until data saturation had been achieved. The semi-structured format of the interviews and discussions was examined by content analysis using the Colaizzi method^[34], which allowed for probing and clarification of response, and was designed to minimize interpretation.

The data gathering methods not only ensured trust between researchers and participants, but also served to continuously enrich the analyses of the three researchers, who were specialists in entomology, epidemiology, and community-based study. Moreover, the trustworthiness of the study was assured by having certain community members recheck the conclusions for credibility. This is an important step in qualitative research^[30]. The study participants included 60 community leaders and 60 representatives from regular households, in an effort to reach a core group of people in the communities^[1,9].

From the study's data, some important lessons can be summarized which can lead to future anti-dengue program development. Firstly, it was discovered that many participants shared the opinion that the motto should be "everyone, every sector, all participating,

and with continuing activities." Their interpretation of sustainable dengue prevention and control may differ from other dengue issues because this meaning was based on the participants' direct dengue experiences, or those of their family or neighbors. Secondly, 10 domains were agreed upon to form an initial conceptual definition, which was originally built from the literature review [9,36].

The last, not surprisingly, was that all community leaders, such as the local administrative organization officials, formal community leaders, teachers and students, religious leaders, health workers, village health volunteers, and non-community leaders, such as villagers, were held equally responsible for sustainable dengue prevention and control. Although non-community leaders were the key stakeholder for conducting and maintaining dengue solution activities, their sense of the role of community leadership and network partnerships was that of a need for more involvement with the dengue problem. Sustainable dengue prevention and control strategies require community capacity building, such as improved stakeholder participation, developed community leadership, more empowered organizational structures, improved resource mobilization, stronger network partnerships, and increased program management [14,37].

A certain number of limitations of this study can be identified, such as the sampling method and the sample size. The researchers tried to select sub-districts already using best practices for dengue prevention and control, in high dengue risk provinces, and where people were available to assist in the study. The sub-districts were identified as the best-practice areas of their respective provinces. Another possible limitation of this qualitative study is that the findings may be misunderstood or interpreted with a bias, due to the key informants' responses. Finally, although it is true that focus groups and interviews, as research methods in general, have a limitation in the randomness of their sampling, with the possibility that the results may not be generalizable, they are still effective ways of gathering data. This is particularly true when they are used to obtain information about the feelings, opinions, perceptions, insights, beliefs, misconceptions, attitudes, and receptivity of a group of people concerning an idea.

This paper reports the findings from in-depth interviews and focus group discussions with community members, both leaders and villagers, in four sub-districts in Southern Thailand. The dengue problem

was perceived as a community problem, and the participants had been conducting previous activities aimed at solving the problem. The results identified the means of achieving sustainable community-based dengue prevention and control, and contained common themes for the success of a sustainable dengue problem/solution program. These domains have been documented in other community capacity-building conceptual works [9,36]. However, in contrast to just a few work periods, the focus group discussions and in-depth interviews in this study provided detailed insights into the success factors of a sustainable dengue problem/solution program. Moreover, the 120 participants in the four sub-districts pointed out that successful larval control was possible only if carried out by all households and all sectors in a community, and if control agents were available and accessible. The routine methods identified are as following: covering drinking water containers, cleaning water containers every week, keeping fish in containers with water plants, destroying mosquito breeding places, and using fogging or chemicals only at critical times. The participants' perception of a successful and sustainable dengue control program was that it must have the following: all community members' participation, the leadership of community leaders, a core dengue activities group, a problem-solving needs assessment, dengue information transfer, a sense of community for dengue problem-awareness, a partnership network, critical dengue-situation management, and continuing dengue prevention and control activities.

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