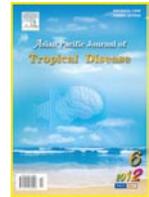
Contents lists available at [ScienceDirect](http://www.sciencedirect.com)

Asian Pacific Journal of Tropical Disease

journal homepage: www.elsevier.com/locate/apjtd

Document heading

Children's basic knowledge and activities for dengue problem solution: an islamic religious school, Southern Thailand

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ARTICLE INFO

Article history:

Received 27 August 2012

Received in revised form 7 September 2012

Accepted 10 November 2012

Available online 28 December 2012

Keywords:

Children's activities

Dengue knowledge

Islamic religious school

Muslim community

Southern Thailand

ABSTRACT

Objective: To develop children's basic knowledge and activities to solve the dengue problem, and to evaluate the results from children's activities. **Methods:** Participatory Action Research (PAR) was applied in five steps: 1) preparation step; 2) assessment step; 3) children's activities planning step; 4) implementation step; 5) evaluation step. Basic knowledge of dengue was evaluated by questionnaires (17 items) and analysis pre and post-activities by a Chi-square statistic test. The children's understanding of the dengue problem was evaluated by drawing pictures and participation of children's activities. Larval Indices (BI, HI, and CI) were ratio analysis which related dengue outbreak measurement. **Results:** Three groups for children's activities were: 1) group leaders (13 children); 2) general children; 3) a support group from the community. "Education of dengue learning", "dengue prevention campaign", and "the recycle garbage bank" were core children's activities. Most children's knowledge question items showed an increase from pre-activities to post-activities, and a half of all questions items were statistically significantly different ($P < 0.05$). There were five categories of children's reflection from the drawn picture that showed understanding of the solution to dengue problems and methods for eliminating sites of mosquito breeding in the community. Their households had increased garbage management, and thus decreased numbers of mosquito breeding types such as larval indices (BI, HI, and CI) which decreased from before the activities (93, 30, and 14) to after them (7, 5, and 1). Furthermore, no instances of dengue morbidity or the mortality rate occurred during the study. **Conclusions:** Although there was an increase in the children's knowledge and activities, and a decrease in larval indices ratio, the high risk of a dengue epidemic might be found because the ratios of larval indices were based on community's behaviors. Thus, it is essential for children and all stakeholders in and out of the community needed to better combat the dengue problem.

1. Introduction

Dengue is one of the most important arthropod-borne viral infections affecting humans. Worldwide, an estimated 2.5 billion people are at risk of infection, approximately 975 million of whom live in urban and rural areas in tropical and sub-tropical countries^[1]. In Thailand, dengue has been a significant public health problem for the past fifty years. Although the mortality rate has decreased in hospitals, the morbidity rate has unfortunately increased in all areas from 1998 to 2009. The southern area, especially, has higher dengue incidence than other areas, possibly due to factors

such as a greater number of rainy days, more rainfall, higher relative humidity, and a warmer temperature^[2]. Southern Thailand has a dengue problem because the high morbidity rate and high larval indices.

Nakhon Si Thammarat is one of the fourteen provinces in Southern Thailand with several high risk dengue communities. The Islamic community studied consisted of 128 households in 600 square meters. The locations of the houses in the community were semi-urban, closed households, low socioeconomics (mean 5 124.35 baht/month), and almost all were laborers and fisherman. The population in the community was 733, consisting of 357 males, 376 females which was divided into the following age groups: 0–5 years (36 people), 6–12 years (113 people), 15–20 years (73 people), 21–40 years (239 people), 41–60 years (192 people), and more than 60 years (80 people). Thus, most of the populations were children. In the past years, two children

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had dengue, the morbidity rate of dengue in October, 2009 to September, 2010 was 638 per 100000 people and higher than the Thai Ministry of Public Health's disease standard (<20 per 100000 populations). Although, there were no instances of mortality during this time, the morbidity showed that the area was at risk of a dengue epidemic. Moreover, the larval indices (BI: 74, HI: 22, and CI: 12) of the community were higher than the standard (BI<50, HI<10, and CI<1). These indexes were strongly positively correlated with epidemic and transmission intensity^[3, 4].

There were 80 children studying at the Islamic religious school in the community which opened every Saturday and Sunday and teaching Islamic ideals such as the Islamic legal code, role and function of the Muslim people, and the major activities of Muslims. Their age was 7–15 years. All stakeholders in the community and the children group leaders met and concluded that children's activities were needed for solving the dengue problem because dengue morbidity was found for two children in the school. Previous studies have shown that school-based education and activities are an important compliment to increasing children's knowledge of and participation in the dengue problem solution^[5–8]. Thus, the present study aims to develop children's basic knowledge and activities for addressing the dengue problem, and to evaluate the results from children activities.

2. Materials and methods

The study was a part of the eradication of *Aedes aegypti* sources through dengue prevention and control in an Islamic community, in the southern region of Thailand. Participatory Action Research (PAR) was applied in this study. The study was received and forwarded to the International Review Board (IRB), the Ethical Review Committee for Research Subjects, the Health Science Group, Walailak University, Thailand.

2.1. Study area and participants

The study took place between November, 2010 and June, 2011, in a Saturday and Sunday Islamic religious school, Southern region, Thailand. The school has a traditional Islamic education program for 80 children, three Islamic religious teachers and ten Muslim religious leaders. The participants of study for development of knowledge and activities were children and their households for larval indices survey.

2.2. Methods

Participatory Action Research (PAR) was applied to five steps: 1) preparation step; 2) assessment step; 3) developing strategies planning step; 4) implementation step; and 5) evaluation step.

2.2.1. Preparation step

The principle researcher discussed with representatives of all stakeholders the dengue problem in the Muslim community such as community leaders, Islamic religion teachers, religious leaders, the district administrative organization, primary health care station and the children's parents. The meeting concluded that children in the school had a high dengue morbidity rate related to high levels of larval indices in the community and a high risk of dengue transmission^[9].

2.2.2. Assessment step

The assessment step consisted of situation assessment and re-assessment of the children's basic knowledge and the results of children's activities. The situation assessment used qualitative methods by the researcher such as leader group discussions, and environmental surveys. This phase was selected in order to better understand the diversity of the dengue problem. Basic knowledge of dengue was assessed by researcher. The assessment consisted of: 1) leaders group discussions, volunteer children met to discuss at least once a month to assess, plan, implement and re-assess; 2) larval indices survey in children's household community; and 3) dengue mortality and morbidity monitor from the primary health center. 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 30 to 45 min per meeting.

2.2.3. Developing children's strategies planning step

This step followed the preparation and assessment steps. The researcher, supportive group, and the group leader of the children were discussing techniques and methods of analysis of the dengue problem to find solutions in school over a six month period.

2.2.4. Implement step

The basic strategies for dengue prevention and control were engaging together in activities within children, leader and non-leader groups. The study built abilities through training, group discussions and consensus, promotional campaigns, and operational meetings once a month. The large meetings of all the children were participatory and created several plans for dengue solutions from the beginning until the end of intervention.

2.2.5. Evaluate step

Leader and support groups presented the process and outcomes of the study for all children in the school. The process and outcomes would encourage routine activities for dengue prevention and control in an Islamic school. The main activities of the step were the re-assessment step centred on assessing the outcomes. The step was a feedback step for others steps such as the assessment, plan, implementation, and comparison before and after

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