# Family Leader Empowerment Program Using Participatory Learning Process for Dengue Vector Control

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***Objective:*** *Assess the performance of the empowerment program using participatory learning process for the control of Dengue vector. The program focuses on using the leaders of families as the main executer of the vector control protocol.*
***Material and Method:*** *This quasi-experimental research utilized the two-group pretest-posttest design. The sample group consisted of 120 family leaders from two communities in Mueang Municipality, Chachoengsao Province. The research was conducted during an 8-week period between April and June 2010. The data were collected and analyzed based on frequency, percentage, mean, paired t-test, and independent t-test. The result was evaluated by comparing the difference between the mean prevalence index of mosquito larvae before and after the process implementation in terms of the container index (CI) and the house index (HI).*
***Results:*** *After spending eight weeks in the empowerment program, the family leader's behavior in the aspect of Dengue vector control has improved. The Container Index and the House Index were found to decrease with p = 0.05 statistical significance.*
***Conclusion:*** *The reduction of CI and HI suggested that the program worked well in the selected communities. The success of the Dengue vector control program depended on cooperation and participation of many groups, especially the families in the community. When the family leaders have good attitude and are capable of carrying out the vector control protocol, the risk factor leading to the incidence of Dengue rims infection can be reduced.*

***Keywords:*** *Empowerment, Dengue vector control, Container index (CI), House index (HI)*

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Dengue hemorrhagic fever (DHF) is the disease that has long been endemic in the tropical and subtropical regions of the world. In 1998, many countries in the South-East Asia and Western Pacific regions experienced epidemics of DHF. These countries included India, Indonesia, Maldives, Myanmar, Singapore, Malaysia, Vietnam, Laos, Cambodia, and Thailand[1]. The disease continued to show increasing incidence and geographical spread with more frequent outbreaks throughout both regions. Although sporadic cases of severe DHF had been reported in Thailand since at least a decade earlier, the first epidemic of the severe form of DHF occurred in 1958. Over the next 40 years, there were major epidemics of DHF every two to four years, with each succeeding epidemic becoming progressively larger as the disease spread to all parts of the country. DHF will continue to increase as a major public health problem in Thailand[2]. It is commonly recognized that one of the most effective ways to prevent DHF is by controlling its vectors, *i.e.* the *Aedes aegypti* mosquitoes and their probable egg-laying sites. Any water containers found, both inside and outside a living quarter, must be properly taken care of in order to prevent the mosquitoes from depositing their eggs. This task cannot be accomplished without involvement of every household in a community. Public participation is therefore a necessary process for solving this public health problem.

Implementation of a public participation process, however, requires commitment of the community to be effective. In Chachoengsao Province, for instance, a public participation program has already been implemented to tackle the spread of DHF[3]. While the program works well to a certain degree, it is unable to solve the problem consistently. Between 2004 and 2008, the annual morbidity rates in Mueang Municipality were at 285.00, 148.65, 176.34, 146.11 and 275.22 per 100,000 populations. The container index (CI) and the house index (HI) were found to be 54.32 and 70.34 respectively. Both indices indicate a high-risk of Dengue rims infection. The

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fluctuation in the annual morbidity rates and the high-risk indices suggest the failure of the public participation program. There are two main reasons of the failure-first, the community does not recognize the importance of the program; and second, the community lacks leadership entity to carry out the program. These problems are consistent with a previous study that investigated the problem of public participation for waste management and found that the failure of the program was due to receiving insufficient cooperation from the local community[4].

Empowerment is an important method that can be applied along with the public participation process. This method is known to be able to effectively change behavior of individuals within a group. Through an empowerment program, the group members are given necessary tools to identify the problem and its causes and are encouraged to find suitable solution by themselves[5].

In this research, an empowerment program has been designed specifically for Dengue vector control. In order to assess its effectiveness, the program has been implemented in two communities in Chachoengsao Province. The program targets directly at leaders of the families in the communities. In this way, the lack-of-leadership problem often encountered by other public participation programs is solved. The utilization of empowerment method in this program is also aimed to capture interest of the family leaders so that the community as a whole recognizes the importance of the problem[6]. The family leaders are encouraged to learn about the problem (*i.e.* the disease), and try to identify the causes of the problem using their own assessment. Ultimately, they can improve their potential and cooperation to design an effective protocol to control Dengue vector that suits their behavior and life style. The success of this program depends on the degrees of participation and active learning of the families in the community in designing the protocol. In turn, the success of the protocol is determined in terms of the Containment Index (CI) and the House Index (HI) of mosquito larvae before and after the implementation of the empowerment program.

**Material and Method**

This quasi-experimental research utilized the two-group pretest-posttest design. The population of interest consisted of leaders of the families that resided in Mueang Municipality, Chachoengsao Province. The samples comprised leaders of the families that resided in Namueang and Sothorn communities located in Mueang Municipality, Chachoengsao Province. One hundred twenty family leaders in the sample group participated in the program. Sixty of them were from the Namueang community, while the rest were from the Sothorn community. Both communities were selected because they were fundamentally similar in terms of age, education, and income. The samples were divided into 2 separate groups: the control group and the experiment group. The experiment group consisted of 60 family leaders who would participate in the empowerment program. The rest of the family leaders were in the control group. They would not be participating in the empowerment program.

The research was conducted over an 8-week period. Support from the public health personnel and the local public health volunteers from respective communities were important elements of the research. Prior to the beginning of the program, the selected public health personnel and local public health volunteers were given details of the tasks they would be performing. During the program, the public health personnel were to provide knowledge about the prevention and control of DHF to the participating family leaders. The local public health volunteers would help follow-up with the family leaders throughout the program. Community leaders from each community were also invited to participate in a meeting to give their opinions regarding the prevention and control of DHF, discuss about problems and obstacles found in implementing DHF prevention and control program in the past and try to come up with solution to the problems.

At the beginning of the program, the family leaders in the experiment group were asked to participate in a two-day workshop to gain necessary knowledge, information and requirements of the program. Initial data related to the family leaders, including some personal information and information on prior behaviors related to the control and prevention of DHF, were collected. Activities during the workshop were designed in accordance with the learning process for empowerment and utilized two participatory learning principles: learning by experience and group process. The family leaders were provided knowledge about the prevention and control of DHF. They also participated in the discussion to find a method for reducing the source of the disease, *i.e.* the *Aedes aegypti* larvae. After the workshop, the family leaders were asked to go home and practice the new knowledge and protocol gained during the workshop. They were required to make a report in the behavior record form provided.

Throughout the program, the local public health volunteer would visit the families once a week for five consecutive weeks to perform follow-up and collect data. This was also to ensure that the family leaders complied with the program while they were at home, and that any questions related to the implementation of the program that they might have were properly answered. At the end, all data were compiled and statistically analyzed based on frequency, percentage, mean, with standard deviation (SD) paired t-test and unpaired t-test and unpaired t-test. P-value was set at 0.05 for significant difference[7].

Two sets of research tools were utilized.

***Experimental tools***

They included the following items.

***An activity manual for the family leader empowerment program***

The manual described and provided instructions on the activities that had to take place during the family leader empowerment program. It had been specially designed based on the five-step learning process for empowerment (namely experiencing, identifying experience, analyzing, planning, and doing) which was created by Bishop[5], and the participatory learning process which comprised experiential learning and group process[8]. The program, hence the activities involved, was divided into three phases. In the first phase, the family leaders were required to attend a workshop arranged by the researcher. In the second phase, the family leaders were asked to apply knowledge gained during the workshop at home by themselves. In the third phase, the family leaders were required to attend subgroup meetings with the researcher to report the progress.

***An activity manual for the preparation of local public health volunteers***

The manual described and provided instructions on the activities needed in order to prepare public health volunteers in the community to assist with various research activities such as arranging the workshop, training the family leaders, and performing subsequent follow-ups with the family leaders.

***A family leader's manual for the prevention and control of DHF***

This manual was aimed for the family leaders. It described roles and responsibilities of a family leader in the prevention and control of DHF, as well as providing recommendations to prevent and control DHF at home.

***A public health volunteer's manual for the prevention and control of DHF***

This manual was aimed for the local public health volunteers. It described roles and responsibilities of a public health volunteer in the prevention and control of DHF, as well as providing recommendations to prevent and control DHF in the community.

***Behavior record form***

The form was to be used by the family leaders to record actions taken to prevent and control DHF at home, and the results of the actions.

***Follow-up record form***

The form was to be used by the local public health volunteers to record actions taken by the family leaders in the community to prevent and control DHF, as well as the results of the actions.

***Data collection tools***

They included the following items.

***General interview form***

Information of the family leaders such as gender, age, marital status, and level of education were recorded in this form.

***Behavior interview form***

Assessments of the actions taken by the family leaders to prevent and control DHF were recorded in this form.

***Aedes larvae survey form***

This form was used for recording the number of containers and houses that contain the *Aedes* larvae.

**Results**

The control and the experiment groups were divided such that they were demographically equivalent, as shown in Table 1 that summarizes and compares the demographic data between the experiment and the control groups. Around 70% of the family leaders who participated in the research were female. The average age of the participants in both groups was 53 years old. Participants of 60 years old and above constituted the largest portion, while the second largest portion aged between 51 and 60 years old. Three quarters of the participants were still married. At

**Table 1.** Comparison of the demographic data between the experiment and the control groups

| | Experiment group | Control group |
|---|---|---|
| Number of participants | 60 | 60 |
| Gender (% female) | 70.00 | 68.33 |
| Age | | |
| 40 and below (%) | 23.35 | 21.68 |
| 41-50 (%) | 21.66 | 20.00 |
| 51-60 (%) | 21.66 | 26.66 |
| Over 60 (%) | 33.33 | 31.66 |
| Average [SD] | 53.46 [14.21] | 53.76 [14.03] |
| Marital status | | |
| Married (%) | 75.00 | 73.33 |
| Widow (%) | 11.66 | 15.00 |
| Single (%) | 13.33 | 11.66 |
| Income | | |
| 0-2,000 (%) | 33.33 | 33.33 |
| 2,001-4,000 (%) | 23.33 | 33.33 |
| 4,001-6000 (%) | 31.67 | 16.66 |
| Over 6,000 (%) | 10.00 | 16.66 |
| Average [SD] | 3,953.75 [2,253.41] | 3,165.53 [2,461.67] |
| Education | | |
| Primary school (%) | 33.33 | 31.86 |
| Secondary school (%) | 35.00 | 38.33 |
| High school or equiv (%) | 31.66 | 30.00 |
| Occupation | | |
| Merchant (%) | 10.00 | 8.33 |
| Farmer (%) | 5.00 | 3.33 |
| Housekeeper (%) | 13.33 | 11.66 |
| Employed, others (%) | 53.33 | 60.00 |
| No occupation (%) | 18.33 | 16.66 |

least 30% had received high-school-level education, and most were employed at the time.

The Container Index, both pretest and posttest, of the two groups has been analyzed. It was found that the mean Container Index of the experiment group had a larger decrease, from pretest to posttest, than the control group. The difference of the decreases was found to be statistically significant with $p < 0.05$ as shown in Table 2.

The House Index, both pretest and posttest, of the two groups has also been analyzed. It was found that the mean House Index of the experiment group had a larger decrease, from pretest to posttest, than the control group. The difference of the decreases was also found to be statistically significant with $p < 0.05$ as shown in Table 3.

## Discussion

The presented empowerment program using participatory learning process was targeted directly at the family leaders. It was an improvement on other generally applied public participation programs that lacked specific leadership. It was able to further reduce the container index (CI) and the house index (HI), which reflected a better control of the Dengue vectors, *i.e.* the *Aedes aegypti* larvae. Since the presented program focused on the participatory learning process, the family leaders were encouraged to identify problem of the existing protocol for the prevention and control of Dengue rims infection, analyze the causes of the problem, and come up with a more effective and suitable protocol to prevent and control Dengue rims infection by themselves, rather

**Table 2.** Pretest and posttest container index (CI) of the experiment and the control groups

| Container index (CI) | Pre-test, M (SD) | Post-test, M (SD) | d (SD) | df | t | p (one-tailed) |
|---|---|---|---|---|---|---|
| Experiment group (n = 60) | 11.86 (10.93) | 0.24 (1.36) | 11.63 (10.59) | 116 | 4.90 | <0.001 |
| Control group (n = 60) | 10.52 (10.31) | 6.81 (7.51) | 3.74 (6.52) | | | |

M = mean; d = difference of decreases; SD = standard deviation

**Table 3.** Pretest and posttest house index (HI) of the experiment and the control groups

| House index (HI) | Pre-test, M (SD) | Post-test, M (SD) | d (SD) | df | t | p (one-tailed) |
|---|---|---|---|---|---|---|
| Experiment group (n = 60) | 62.31 (16.93) | 3.21 (2.46) | 59.10 (12.96) | 116 | 5.92 | <0.001 |
| Control group (n = 60) | 60.63 (15.34) | 54.03 (12.51) | 6.60 (6.72) | | | |

M = mean; d = difference of decreases; SD = standard deviation

than being told what to do by public health officers or other people. The process allowed them to better understand the situation and empowered them with knowledge and self-respect that would compel them to be more active in the program.

The success of the program also depended on various groups performing their functions. While the participatory learning process expected the family leaders to contribute most of the solution-finding work, the guidance and the technical assistance were provided by the public health personnel and the local public health volunteers.

In the present program, the public health personnel functioned as a speaker, a facilitator, and a collaborator. As a speaker, they provided information about the program, basic knowledge about Dengue rims infection and DHF, and instruction on how to fill out the survey form for the participants of the program._As a facilitator, they led the discussions among the participants during the workshop. As a collaborator, they helped interview the participants and collect research data. The idea was that even after the research ended, these public health personnel would be able to implement the program elsewhere.

The local public health volunteers functioned as an assistant, a supporter, and a collaborator. As an assistant, they assisted the public health personnel during the initial workshop. As a supporter, they helped clarify any questions the participants might have during the workshop and the follow-up visits. As a collaborator, they helped with the follow-up visits and collect research data. Because the local public health volunteers were from the same communities as the participants, they often knew each other since before the program, which helped them overcome the communication barrier that otherwise existed between the participants and the public health personnel. The volunteers were therefore an important key entity to drive the program forward.

Several problems were encountered during the program. Some family leaders were not available to attend the full two days of the initial workshop. In such a case, they were asked to send representatives from their own families to participate in their place. This was to ensure that all families that participated in the program received the same amount of knowledge and information. Another problem was that some family leaders did not fully understand how to record information in the *Aedes* larvae survey form. To fix this problem, the local public health volunteers were instructed to ensure that the family leaders were able to correctly fill out the form during their follow-up visits.

This empowerment program emphasized the leadership role of the family leaders. However, it has two main limitations. First, this program has been designed based on the hypothesis that the family members would listen and follow their family leaders. Hence, the program would only work well in a culture where relationship between the leader and the members of the family still fits the hypothesis. Second, the local public health volunteers play an important role in ensuring that the family leaders comply with the program. Thus, in a city-like community where each family lives individually with little interaction among each other, the local public health volunteers may not be able to establish close communication and fully perform their functions.

It is worth pointing out that while the prevention and control of DHF have been mentioned several times and used as an overall goal of the program, the scope of this work is merely on the control of Dengue vectors. Dengue vectors are known to be an influential factor that may lead to incidence of DHF. Nevertheless, it is not the only factors. Climate, for instance, can cause variation in the incidence of DHF. Due to the small number of incidence of DHF in the areas that the program was implemented, the data on DHF during the time of the present study did not vary significantly. However, data on the container index and the house index showed significant change. Thus, the correlation between CI (or HI) and the incidences of DHF could not be concluded in the present study.

**Conclusion**

This research explored an empowerment program using participatory learning process for the control of Dengue vectors. The program directly targeted the leaders of families in a community in order to establish leadership to carry out the vector control protocol. The program was implemented in two communities, and found to be able to significantly reduce the Container and the House Indices. This suggests a better control of the Dengue vectors. The program required cooperation of not only the family leaders, but also the public health personnel and the local public health volunteers. The latter group was especially important because it linked the first two together. The program also required strong commitment of policy makers and community leaders, integration of control activities in other sectors, and mobilization of resources. Long-term vector control

should also be based on health education and community participation, and will require full supports from the authorities in the forms of legislation and law enforcement. It is hoped that such a program will contribute to the overall goal of prevention and control of Dengue infection and DHF.

**Potential conflicts of interest**

None.

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## *การสร้างพลังแกนนำครอบครัวโดยใช้กระบวนการเรียนรู้แบบมีส่วนร่วมต่อการควบคุมพาหะนำโรคไข้เลือดออก*

***วีระพงษ์ เพ่งวาณิชย์***

***วัตถุประสงค์****: การศึกษานี้มีวัตถุประสงค์เพื่อประเมินประสิทธิภาพของโปรแกรมการสร้างพลังแกนนำครอบครัวโดยใช้กระบวนการเรียนรู้แบบมีส่วนร่วมต่อการควบคุมพาหะนำโรคไข้เลือดออก โปรแกรมนี้มุ่งเน้นไปที่การสร้างแกนนำครอบครัวให้เป็นผู้นำในการปฏิบัติการควบคุม*

***วัสดุและวิธีการ****: การศึกษาครั้งนี้เป็นการศึกษากึ่งทดลองแบบสองกลุ่มก่อนและหลัง กลุ่มตัวอย่างเป็นแกนนำครอบครัว ในอำเภอเมือง จังหวัดฉะเชิงเทราจากสองชุมชนจำนวน 120 คน การทดลองใช้เวลาดำเนินการวิจัยทั้งหมด 8 สัปดาห์ ระหว่างเดือนเมษายน ถึง เดือนมิถุนายน พ.ศ. 2553 ข้อมูลที่เก็บได้จะนำไปวิเคราะห์ด้วยสถิติเชิงพรรณาและทดลองความแตกต่างของค่าเฉลี่ยด้วยสถิติ paired t-test และ สถิติ Independent t-test ผลที่ได้จะนำไปเปรียบเทียบความแตกต่างระหว่างค่าเฉลี่ยของดัชนีภาชนะ (CI) และดัชนีบ้าน (HI) ก่อนและหลังโปรแกรม*

***ผลการศึกษา****: เมื่อเสร็จสิ้นการทดลองพบว่าแกนนำครอบครัวในกลุ่มทดลองมีพฤติกรรมการควบคุม และป้องกันโรคไข้เลือดออกดีขึ้นกว่าก่อนทดลอง และดีกว่ากลุ่มควบคุมโดยมีค่าดัชนีความชุกของลูกน้ำยุงลายลดลงกว่าก่อนทดลอง และลดลงมากกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05*

***สรุป****: การลดลงของค่าดัชนีภาชนะและดัชนีบ้านแสดงให้เห็นถึงความสำเร็จของโปรแกรม การควบคุมพาหะนำโรคไข้เลือดออกให้ประสบความสำเร็จได้ผลดีนั้นต้องอาศัยความร่วมมือ และการมีส่วนร่วมของทุกภาคส่วนในชุมชน โดยเฉพาะอย่างยิ่งการมีส่วนร่วมของครอบครัว ซึ่งถ้าครอบครัวมีแกนนำที่มีทัศนคติที่ดี และมีความสามารถในการดำเนินงานควบคุมพาหะของโรคก็จะสามารถลดปัจจัยเสี่ยงที่จะนำไปสู่การติดเชื้อไข้เลือดออกได้*