Perceived self-efficacy to plan and execute an environmental action plan for dengue control among Filipino University students

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Abstract

This study sought to evaluate the change in the perceived self-efficacy in students exposed to a training module with field exercise to conduct an environmental action plan for dengue control. Eighteen education students at a Filipino university participated in the study. A pretest-post-test design was employed. Evaluation was conducted through a nine-point self-efficacy scale. Field exercises were conducted on the grounds of the university campus. The results demonstrated statistically significant increases in perceived self-efficacy scores.

Keywords: Dengue control; Environmental action plan; Self-efficacy; Students.

Introduction

Dengue fever/dengue haemorrhagic fever (DF/DHF) is at present the leading mosquito-borne viral disease worldwide.\(^1\) Dengue especially affects school-age children and youth.\(^2\) Schools, especially in the tropical and subtropical dengue-endemic areas, are frequently the breeding sites for Aedes aegypti, the carrier of the dengue virus.\(^3,4\) Teachers and students therefore potentially provide key links between the schools, the students and the community in dengue control.\(^5\) Teachers have the potential not only to be trainers to their students in dengue control but also can serve as role models on their school campus grounds. In addition, teachers can serve as facilitators for community action, especially as their students are able to carry out dengue control activities, such as environmental action plans for their own homes and neighbourhoods.

Mosquito larval control through source reduction of mosquito breeding sites remains a primary emphasis in dengue control.\(^6\) Various international projects lay stress on source reduction for dengue control at the community level and at schools.\(^7\)

A number of studies have described the mobilization of schoolchildren through involvement of teachers. In the English-speaking Caribbean, teachers trained children as community-change agents through an environmental health model.\(^8\) In Colombia, eleventh graders, after 20 hours of training, conducted community-wide dengue control
communication. One creative approach was the use of calendars in classrooms by teachers.\textsuperscript{9} In Malaysia, schoolchildren distributed weekly worksheets to households.\textsuperscript{10} In Puerto Rico, fourth graders had a dengue educational booklet integrated into class work. Their teachers received specific training as a part of the programme.\textsuperscript{11} In Honduras, primary-school children, after receiving training by teachers, conducted household mosquito control surveys. Also in the study, parents and teachers had an increased awareness about mosquito control.\textsuperscript{12} However, no study has been done to show that teachers, or students who had been trained, had undergone field exercises to prepare them in dengue control, let alone examine the participants’ confidence levels through their experience.

The health behaviour theory provides a framework to conduct health education and health promotion programmes.\textsuperscript{13} Self-efficacy, a construct of Social Cognitive Theory, is a powerful predictor of behaviour.\textsuperscript{14,15} One’s efficacy beliefs are central to this construct. According to Bandura, “Perceived self-efficacy refers to beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments.”\textsuperscript{15} Self-efficacy significantly increased in two dengue-related studies, one in Thailand,\textsuperscript{16} and the other in the Philippines.\textsuperscript{17} In Thailand, self-efficacy to carry out source-reduction measures to reduce mosquito breeding sites increased through a community-based programme.\textsuperscript{16} Self-efficacy to perform dengue prevention and control measures significantly increased as a result of the play of a board game among Filipino elementary and high-school students.\textsuperscript{17}

No study has yet demonstrated the use of an environmental action plan for teachers or future teachers to increase self-efficacy of mosquito larval prevention and control measures to control dengue. Therefore, this study sought to examine whether university education students (future teachers) may increase their perceived self-efficacy to conduct dengue-related mosquito control measures through the use of environmental action plan training and experiential field activity to control mosquito breeding sites in a university setting. In this study, perceived self-efficacy is operationalized to be defined as the beliefs one has in one’s capability to execute an environmental action plan as later described in this study. This refers to the self-reported self-efficacy without validation through behavioural indicators.

**Materials and methods**

**Participants**

Eighteen students from the Foundation University College of Education course entitled, “Personal and Community Hygiene” in Dumaguete city, Philippines, a dengue-endemic city participated in the study in 2005. The student group included 14 females and four males and had no previous exposure to the environmental action plan. Participation in the evaluation of the study activities was voluntary. All the students participated till the completion of the exercise. The majority of the students were primary-school trainees while the remainder were secondary-school trainees. The breakdown of the number of first-, second- and third-year students was seven, nine and two respectively. There were no fourth-year students, as all of them had previous exposure to the environmental action plan. The average age of the students was approximately 20 years.
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Materials

A nine-item self-efficacy questionnaire was distributed to the participants. This questionnaire covered such topics as confidence in the following: regular removal of disposable containers, cover reusable containers, change water in flower vases, removal of used tyres, turn over open coconut shells, participation in environmental clean-up, as well as identification of mosquito breeding sites. It was previously distributed to elementary and high school student trainees, as well as student-teachers. This questionnaire was pre-tested with student-teachers at a seminar. Similarly, an environmental action-plan format was also utilized by the students. This format was also previously conducted by education students as well as discussed in training for student-teachers.

Procedures

Prior to attending a teaching session on the use of an environmental action plan for dengue-related mosquito control, students were given the self-efficacy questionnaire. The teaching session opened with a learner-centred, problem-posing self-discovery, action-oriented module addressing mosquito larval control, and thus the need of source reduction. The training included visual survey and area mapping of potential mosquito breeding sites, followed by instruction on creation of environmental action plans for the control of potential mosquito breeding sites. The action plan steps included: identification of mosquito breeding sites, number of mosquito breeding sites, action to be taken, how frequently the control activity should be undertaken, and by whom. The following day the students were assigned in groups to conduct visual surveys, mapping and creation of environmental action plans in and around designated buildings and areas around the campus. Each designated campus area had its own environmental action plan. However, there was a core set of environmental problems common to all environmental action plans in this study. This included such topics as the identification of disposable water containers and covering of open containers. Three days later the students received a post-test of the self-efficacy questionnaire.

Data analysis

For reliability, a Cronbach’s alpha was calculated on the questions of the pretest questionnaire by SPSS 15.0 for Windows. The possible differences between the pretest and post-test self-efficacy scores were analysed by paired t-test. All t-tests were two tailed. Statistical significance was set at the .05 level. The analyses were calculated on MS-Excel.

Results

The Cronbach’s alpha for reliability for the self-efficacy questionnaire was .92. This score indicated that the study’s results were reliable. Behavioural capability (knowledge) was assessed through the successful completion of all steps of the environmental action plan by all groups. This included identification of the core environmental problem sets in all environmental action plans.

The results of the two-tailed paired t-test with a critical $t$ of 2.111 revealed a significant difference between mean self-efficacy scores, $t(17)=2.517; p<0.0222$. The sample mean self-efficacy score for the post-test was significantly higher than the pretest (for pretest, mean = 5.574, variance = 2.296; for post-test, mean = 6.439, variance = .419). The increased difference in the mean scores was .865. This resulted in a 15.52% increase of mean scores, from pretest to post-test.
Discussion

This study’s results demonstrated a significant increase in the perceived self-efficacy mean scores of dengue-related environmental control measures from the pretest to the post-test. This suggested that the training accompanied with field exercise to conduct the environmental action plan for the control of mosquito breeding sites was effective as a means to increase perceived self-efficacy to carry out environmental control activities through the use of environmental action plans.

This study had its limitations in its small size, the absence of a control group, as well as the absence of environmental clean-up behavioural observations. However, since higher-level education students at this university had undergone training in the environmental action plan for dengue control, the group of students in this study remained a valuable sample of education students previously unexposed to the environmental action plan for dengue control.

Why the concern about perceived self-efficacy or efficacy beliefs related to dengue control? Typically, sustained self-efficacy, and, additionally, sustained positive environmental behavioural change, ought to be the concern. However, before one can get to these important issues it is desirable to get a programme’s start on a firm footing. According to Bandura, “Efficacy beliefs influence goals and aspirations. The stronger the perceived self-efficacy, the higher the goals people set for themselves and the firmer their commitment to them. Self-efficacy beliefs shape the outcomes people expect their efforts to produce.”[14] That is why Bandura stresses the importance of self-efficacy as an indicator of behavioural intent. A new or special activity may heighten enthusiasm or spark interest, but not necessarily elevate self-efficacy. Some activities may demonstrate initial observable behavioural changes. However, without a high level of perceived self-efficacy, the sustainability of such activities may falter. Consequently, increasing perceived self-efficacy may be important before investing time, energy and activities in a dengue control programme.

This study demonstrated that university education students were able to increase their perceived self-efficacy to perform dengue control activities through a single training and simple environmental action plan activity. Education students eventually become student-teachers, and, in time, teachers. Increasing one’s perceived self-efficacy to perform specific dengue-related mosquito control activities during the university course may aid future teachers to potentially increase their skills to carry out dengue control activities. This will put future teachers in a better position to become school and community leaders for the control of dengue.

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References


