EFFECTIVENESS OF PARTICIPATORY LEARNING PROGRAM ON PESTICIDE UTILIZATION AMONG AGRICULTURISTS IN SRINAKORN DISTRICT, SUKHOTHAI PROVINCE

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ABSTRACT: The effectiveness of a two-day participatory learning program to educate agriculturists on pesticide utilization was evaluated using a quasi-experimental research design with a control group. The program evaluation was performed using pre-test and post-test questionnaires administered two weeks apart. The sample size was 41 subjects in each group. Results showed that the experimental group had significant higher scores ($p < 0.001$) of knowledge, attitude and practice than that prior to participate in the learning program while in the control group scores were not significantly different ($p > 0.05$) between pre- and post-evaluations. Thus the participatory learning program was concluded to be effective.

Key words: participatory learning; pesticide; knowledge, attitude, practice

INTRODUCTION: Pesticides are dangerous not only for direct users but also for residents living nearby, consumers, and environment[1]. The utilization of pesticides had continued to increase in Thailand[2]. Data of occupational diseases from 1998 to 2003 showed that there were 4398, 3930, 3109, 2653, 2571, and 2349 reported cases of pesticide poisoning and these cases contributed to 71%, 67%, 40%, 45%, 55%, and 55%, respectively, of all occupational disease cases being reported[3]. Although numbers of deaths from pesticide poisoning were less than one percent of all the reported cases, pesticide poisoning was the leading cause of deaths among all occupational diseases. Thus pesticide poisoning is the important problem needed much attention and research.

Our study aimed to study the effectiveness of participatory learning program on pesticide utilization by measuring knowledge, attitude, and practice of agriculturists in Srinakorn district, Sukhothai province.

METHODS: A quasi-experimental research design with a control group was implemented using pre-test and post-test questionnaires administered two weeks apart. Srinakorn district was purposively selected based on budget, readiness and willingness to participate of health staff. Nongbua and Khlongmaplab sub-districts were chosen to be the experimental and control groups, respectively.

We divided the research procedure into 3 phases: preparing the study sites, preparing participatory learning program with stakeholders, and implementing a two-day participatory learning program. The participatory learning program consisted of four education modules focusing on: (a) type of pesticides, classification and hazards of pesticides, and proper methods for choosing pesticides; (b) pesticide utilization and its impact on the environment, guidelines for safe use of pesticides, operation of protective devices, and self-care; (c) pesticide problems, impact of pesticides on health, first aid for pesticide poisoning, and patient transfer system; and (d) alternative biotechnology or effective micro-organism (EM).

Pre-test and post-test evaluations were based on the validated questionnaires from Lojananont[5]. We modified the questionnaires to fit the context of this study. The questionnaires had four sections: (a) personal characteristics, (b) knowledge of pesticide utilization, (c) right health attitude of pesticide utilization,

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and (d) safe practice of using pesticides. The pre-test questionnaire contained all the sections while the post-test questionnaire had only the last three sections.

Sample sizes were calculated based on mean differences of knowledge, attitude, and practice from studies of Srikam[6] and Pitasawad[7] using .05 for alpha, .80 for power, and +10% to account for potential lost to follow up. The final sample size was 41 households (one subject per each household) in both experimental and control groups or 82 subjects in total. Proportional sampling was used to select households in each village. As for data collection, the pre-test questionnaire was administered on the first day of participatory learning program in the experimental group and after 2 weeks the post-test questionnaire was administered. Data collections for the control group were collected at the same time period as the experimental group.

Data analyses were performed using descriptive statistics (frequency, mean, standard deviation, and percentage) and inferential statistics (χ^2, *t*-test, and paired-*t* test) to evaluate differences of characteristics between experimental and control groups and to evaluate changes of participants' knowledge, attitude, and practice within two-week period.

RESULTS: In both groups there was no lost to follow up. Personal characteristics of all the subjects were summarized in Table 1, which shows that the experimental and control groups had similar characteristics except for gender.

Knowledge, right health attitude, and safe practice of pesticide utilization were each categorized into three levels according to Srisa-ard[8] and Suchat[9]. Results were summarized in Table 2. After the program implementation the experimental group had significant increases in knowledge levels and these increases did not present in the control group. For attitude level, there was a slight shift from low to moderate in the experimental group while reverse trends were observed in the control group. For practice, there was a slight increase in the overall score of the experimental group while the score remained unchanged in the control. When the mean scores were compared between pre- and post-test evaluations in each group, there were significant increases ($p < 0.001$) in scores of knowledge, attitude, and practice in the experimental group while these increases did not present ($p > 0.05$) in the control group.

DISCUSSION: The participatory learning program on pesticide utilization was proved to be effective as shown with the significant increases ($p < 0.001$) in scores of at least 8 percent on knowledge, attitude, and practice in the experimental group whereas the control group with no program had shown only slight differences ($p > 0.05$) in scores of less than 3 percent which might be because of random fluctuation. While one might yet argue about the effectiveness of the program due to initial differences of mean scores between experimental and control groups, the results were the best as one would hope in the quasi-experimental design because mean scores of the control group surpassed that of the experimental group in which scores remained the same after the program intervention[10]. Our results were consistent with other pesticide studies which used participatory learning approach[6,7,11]. To successfully implement the learning program, a joint effort between government officials in a community and local people must be established. In addition government officials needed to supply funding for the project as well as had confidence in ability to learn and to develop solving problem skills of their local people. Another key to success was to create friendly environment for researchers and the community to interact with one another and one of the approaches was to personally visit houses of village health volunteers to informally discuss issues with them.

Although our study was carefully designed, interpreting the results must be careful as they may be affected by external factors such as previous experience of subjects, a recalled bias from the first evaluation, and different levels of information received from mass media. In addition this study evaluated the

effect of the program only one time in two-week period and hence the results may be different with varying follow-up periods. Lastly using the questionnaires to measure the safe practice of using pesticide may not portray actual behaviors of the subjects and one may apply qualitative approaches such as in-depth interview, focus-group discussion, and observation in addition to the questionnaire.

Table 1 Personal characteristics in both experimental and control groups

Characteristics	Number (%) Experiment (n=41)	Number (%) Control (n=41)	χ^2 (p– value)
Gender			4.904 (0.027)
male	17 (41.5)	27 (65.9)	
female	24 (58.5)	14 (34.1)	
Age*			-
< 30	3 (7.3)	2 (4.9)	
30 - 39	10 (24.4)	7 (17.1)	
40 - 49	17 (41.5)	17 (41.5)	
50 - 59	9 (21.9)	11 (26.8)	
> 60	2 (4.9)	4 (9.7)	
Mean ± S.D.	*43.5 ±9.8*	*46.3 ±8.8*	
Min – Max	*23-65*	*29-62*	
Education level			2.494 (0.476)
illiteracy	-	2 (4.9)	
grades 1-6	28 (68.3)	29 (70.7)	
grades 7-9	7 (17.1)	6 (14.8)	
grades 10-12	6 (14.8)	4 (9.8)	
Duration in agriculture occupation			2.051 (0.359)
less than 1 year	2 (4.9)	-	
between 1-2 years	1 (2.4)	1 (2.4)	
more than 2 years	38 (92.7)	40 (97.6)	
Type of cultivated plants			3.319 (0.345)
1 type	9 (22.0)	8 (19.5)	
2 types	14 (34.1)	17 (41.5)	
3 types	14 (34.1)	8 (19.5)	
4 types	4 (9.8)	8 (19.5)	
Frequency of pesticide application per month			5.875 (0.209)
once	4 (9.8)	2 (4.9)	
twice	11 (26.8)	5 (12.2)	
three times	11 (26.8)	16 (39.0)	
four times	15 (36.6)	16 (39.0)	
more than four times	-	2 (4.9)	

*p=0.569 using independent *t*-test

Table 2 Levels and scores of knowledge, attitude, and practice on pesticide utilization between pre- and post-test evaluations in both experimental and control groups

Pesticide Utilization Score Level	Experiment group Number (%) Pre - test	Experiment group Number (%) Post - test	Control group Number (%) Pre - test	Control group Number (%) Post - test
Knowledge				
Low (0 - 6)	14 (34.1)	-	4 (9.7)	2 (4.9)
Moderate (7 - 12)	25 (61.0)	31 (75.6)	35 (85.4)	36 (87.8)
Good (13 - 15)	2 (4.9)	10 (24.4) *	2 (4.9)	3 (7.3) **
Score (mean ± S.D.)	***7.6 ± 2.7***	***11.8 ± 1.4*** *	***9.2 ± 1.9***	***9.3 ± 2.1*** **
Attitude				
Low (0 - 76)	6 (14.6)	1 (2.4)	2 (4.9)	10 (24.4)
Moderate (77 - 99)	33 (80.5)	38 (92.7)	28 (68.3)	24 (58.5)
Good (100 - 124)	2 (4.9)	2 (4.9) *	11 (26.8)	7 (17.1) **
Score (mean ± S.D.)	***82.8± 7.6***	***92.5 ± 8.7*** *	***89.2 ± 11.2***	***86.0 ± 14.5*** **
Practice				
Low (0 - 53)	8 (19.5)	4 (9.8)	6 (14.6)	7 (17.1)
Moderate 54 - 71)	30 (73.2)	36 (87.8)	35 (85.4)	32 (78.0)
Good (72 - 75)	3 (7.3)	1 (2.4) *	-	2 (4.9) **
Score (mean ± S.D.)	***60.1 ± 11.7***	***66.1 ± 6.9*** *	***61.1 ± 6.5***	***61.1 ± 8.9*** **

* p<0.001 ** p>0.05 using dependent *t*-test

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ประสิทธิผลของการเรียนรู้แบบมีส่วนร่วมเรื่องการใช้สารเคมีกำจัดศัตรูพืชในกลุ่มเกษตรกร อำเภอศรีนคร จังหวัดสุโขทัย

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บทคัดย่อ: ประสิทธิผลของโปรแกรมการเรียนรู้แบบมีส่วนร่วมด้วยระยะเวลา 2 วันเพื่ออบรมกลุ่มเกษตรกรในการใช้สารเคมีกำจัดศัตรูพืช ได้ถูกประเมินโดยการใช้รูปแบบการวิจัยกึ่งทดลองโดยมีกลุ่มควบคุม แบบทดสอบครั้งแรกและครั้งหลังซึ่งช่วงระยะเวลาห่างกัน 2 สัปดาห์ได้นำมาใช้เพื่อประเมินผลของโปรแกรม ขนาดของกลุ่มตัวอย่างมาจากกลุ่มทดลอง 41 คนและจากกลุ่มควบคุม 41 คน ผลการศึกษาพบว่า กลุ่มทดลองมีคะแนนความรู้ ทัศนคติ และการปฏิบัติของการใช้สารเคมีกำจัดศัตรูพืชสูงกว่าก่อนเข้าร่วมโปรแกรมอย่างมีนัยสำคัญทางสถิติ ($p < 0.001$) ในขณะที่คะแนนระหว่างการประเมิน 2 ครั้งของกลุ่มควบคุมไม่มีความแตกต่างกันอย่างมีนัยสำคัญทางสถิติ ($p > 0.05$) ดังนั้นจึงสามารถสรุปได้ว่าโปรแกรมการเรียนรู้แบบมีส่วนร่วมมีประสิทธิผล

คำสำคัญ: การเรียนรู้แบบมีส่วนร่วม; สารเคมีกำจัดศัตรูพืช; ความรู้ ทัศนคติ การปฏิบัติ

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