



Mahidol University
Wisdom of the Land

Effects of insecticide exposure prevention program on exposure and Blood cholinesterase levels of farmers



Sukanda Worapitpong RN., MNS.¹

Nareemarn Neelapaichit, RN, DrPH³

Noppawan Piaseu, RN, PhD, APN/NP⁵

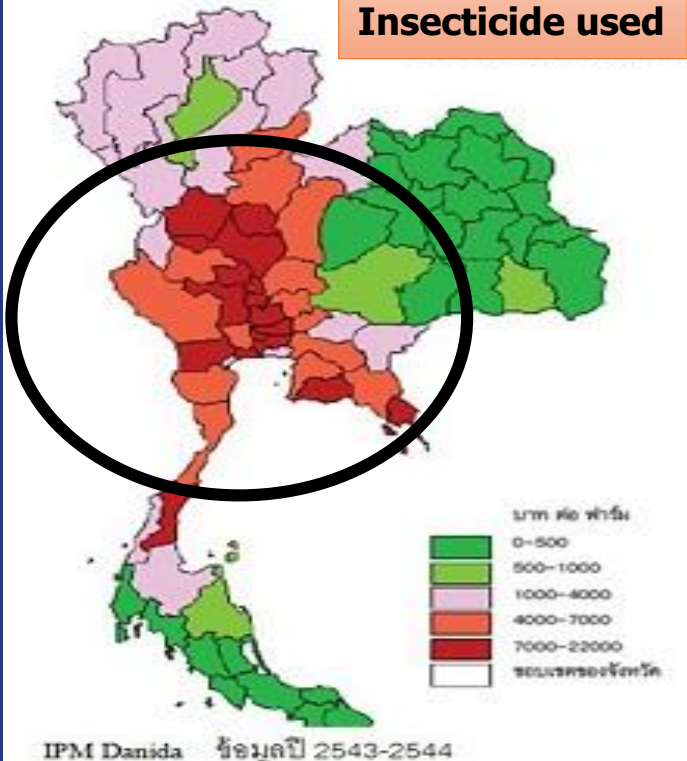
Suchinda Jarupat Maruo, RN, PhD²

Jintana Sirivarasai, RN, PhD⁴

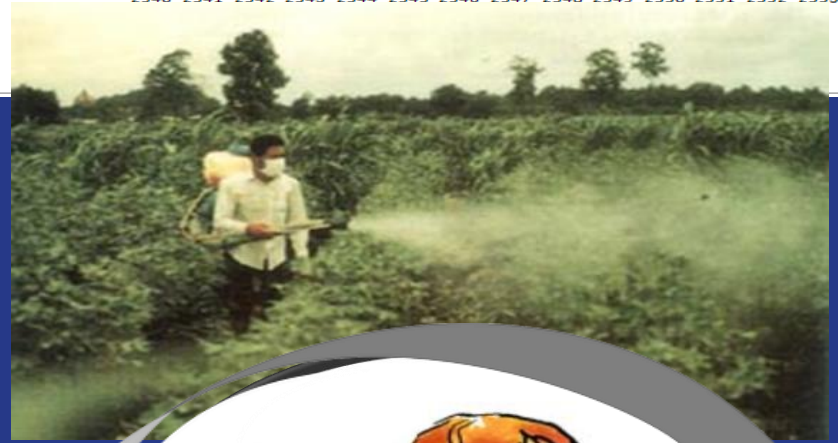
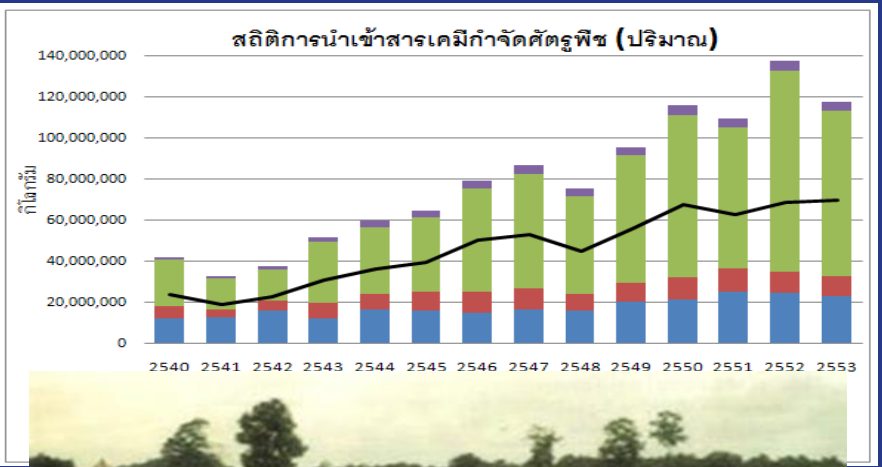
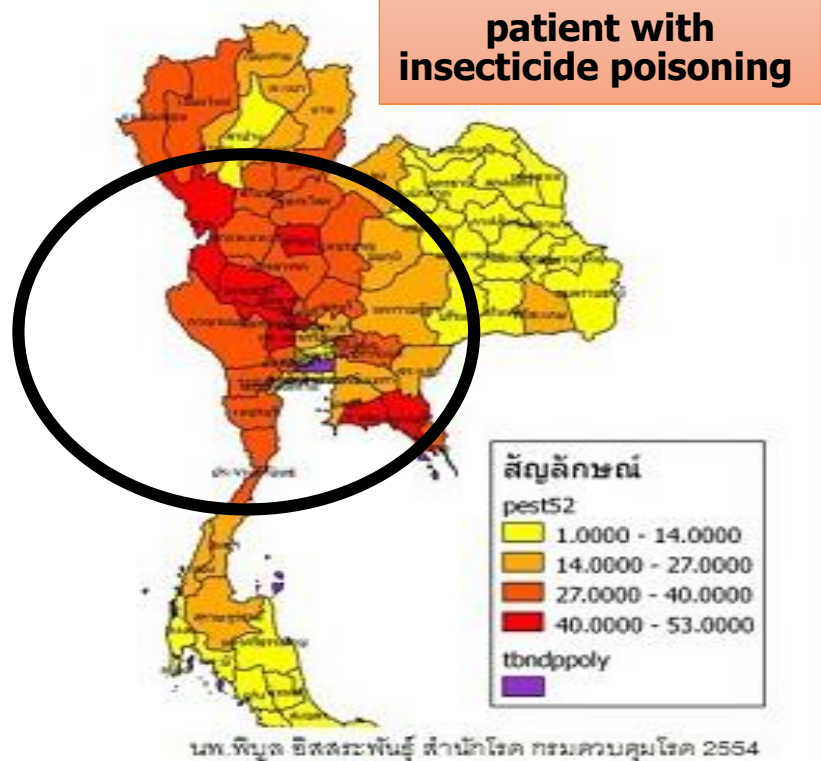


Background

Insecticide used



patient with insecticide poisoning



Area which highly used of insecticide and the number of patient with insecticide poisoning in Thailand

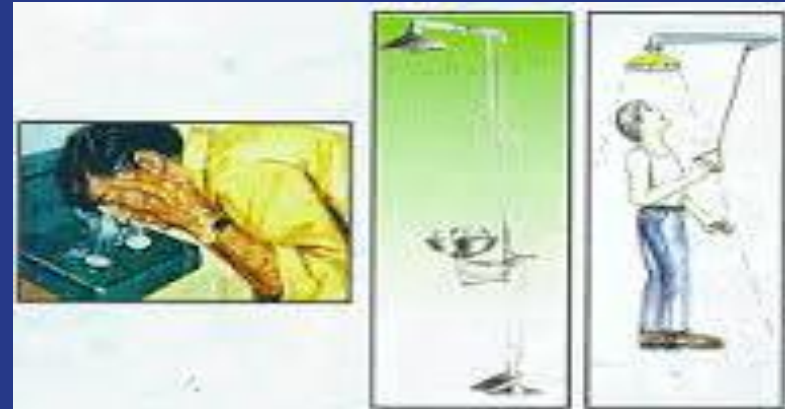




Factors affecting insecticide exposure



Inappropriate mix of insecticide at mixing stage



Long term duration and frequency of application



Inappropriate application method



Inappropriate use of personal protective equipment



Significance

Many farmers have knowledge but lack of awareness.

Mostly previous studies conducted prevention insecticide programs at individual level with no community participation. An integration at both individual and community levels is limited.

Previous studies test effects of prevention insecticide programs using reactive paper with low reliability.

Current policy "The farmer health clinic" in Primary Care Unit (PCU) focuses on education programs.





Research Framework

Structure

- Characteristics of individual, family and community
- Leadership
- Stakeholder
- Community resources
- Health team
- Policy
- Cultural environment

Process

RAMA Model (12 weeks)

- Raising community awareness
- Aiming at targeted health outcome
- Mobilizing change and innovation
- Assuring synergy

Outcome

- Insecticide exposure level
- Blood cholinesterase level



Research Hypotheses

1

- **After the program, the experimental group has less level on insecticide exposure and higher level of blood cholinesterase than those before the program.**

2

- **After the program, the experimental group has less level on insecticide exposure and higher level of blood cholinesterase than control group.**



Research Methodology

Quasi – Experimental Research

Two-group pretest-posttest Design





Sample



Target population = Radish farmers exposed to Organophosphate and Carbamate in Thailand

Sample = Radish farmers exposed to Organophosphate and Carbamate in western Thailand



Control group : 24 farmers in Ratchaburi Province



Experimental group : 25 farmers in Prachuabkhirikhan Province





Sampling and Sample size

- **Purposive sampling.**
- **Sample size determined, based on Power Analysis (Cohen, 1977), using G*Power**
 - **effect size .8 (Somboon, 2011)**
 - **power 80%, obtaining a sample of 21 per group**
 - **Approximately 20 % were added, getting the final sample of 25 per group.**



Instrument

Instruments for screening

The farmers' insecticide exposure screening questionnaire

Instruments for data collection

The farmers' insecticide exposure assessment questionnaire

Scientific equipment included Cobas 6000 (C501) for measurement of blood cholinesterase in the laboratory



Instrument (cont.)

Instrument for experiment

The 12-week Insecticide Exposure Prevention Program



Raising awareness



Aiming at targeted health outcome



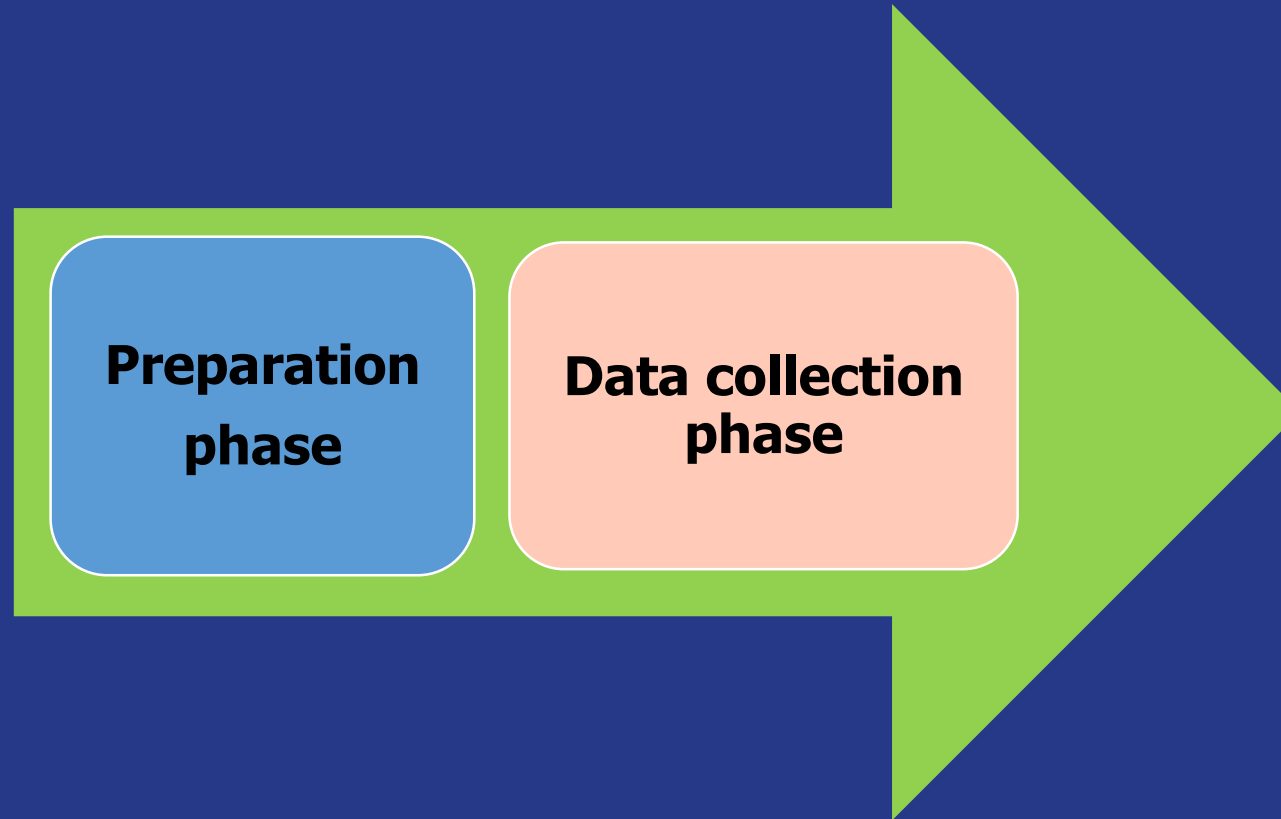
Mobilizing change and innovation



Assuring synergy



Data Collection





preparations

เอกสารแสดงเจตจำนงที่จะทำโครงการวิจัย
Mahachulalongkornrajavidyalaya University
Mahachulalongkornrajavidyalaya University
Mahachulalongkornrajavidyalaya University

เอกสารที่คณะกรรมการบริหารมหาวิทยาลัย
Mahachulalongkornrajavidyalaya University
Mahachulalongkornrajavidyalaya University
Mahachulalongkornrajavidyalaya University



แบบสอบถามเกี่ยวกับ...
1. ...
2. ...
3. ...
4. ...
5. ...
6. ...
7. ...
8. ...
9. ...
10. ...
11. ...
12. ...
13. ...
14. ...





Data collection phase

radish farmers qualified and authorized participants.

Experimental group

- completing insecticide exposure assessment questionnaire
- blood test for cholinesterase

Control group

Raising awareness

week 1 Raising awareness at individual and family levels

Interpretation of results of risk and severity

Group process

week 2 Raising awareness at community awareness

Group discussion

Aiming at targeted health outcome

week 3 community participation

**Receiving
a guide book
for farmers
and routine
care**



Data collection phase (cont.)

Mobilizing change and innovation

week 4 Group process

Assuring synergy

week 6 Implement the plan of the community

Home visits by the healthcare team

week 7 Assessing the outcomes and reflecting

on problems community participation solving

week 8 -10 Implement the plan of the

community ,Home visits by the healthcare team

week 11 Taking insecticide exposure

assessment questionnaire and taking venous

blood to blood cholinesterase in the laboratory

week 12 Assessing the outcomes

Community participation

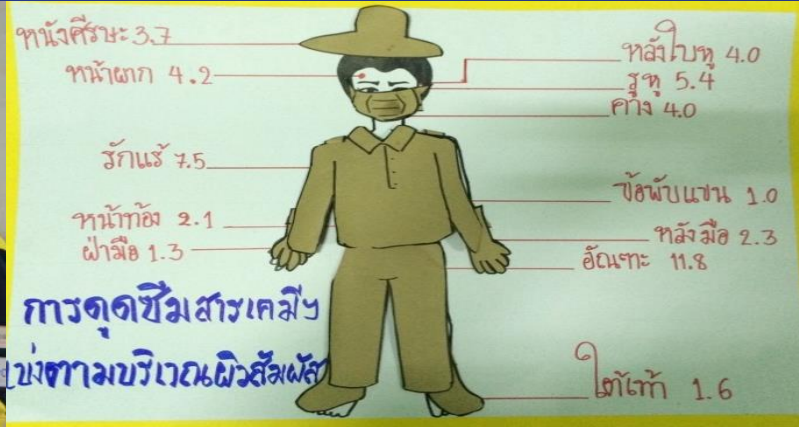
week 11 Taking insecticide exposure assessment questionnaire and taking venous blood to blood cholinesterase in the laboratory.

week 12 Receiving the Program Group process



Raising community awareness

week 1 individual and family awareness





Raising community awareness

week 2 community awareness





Aiming at targeted outcome

week 3 community participation





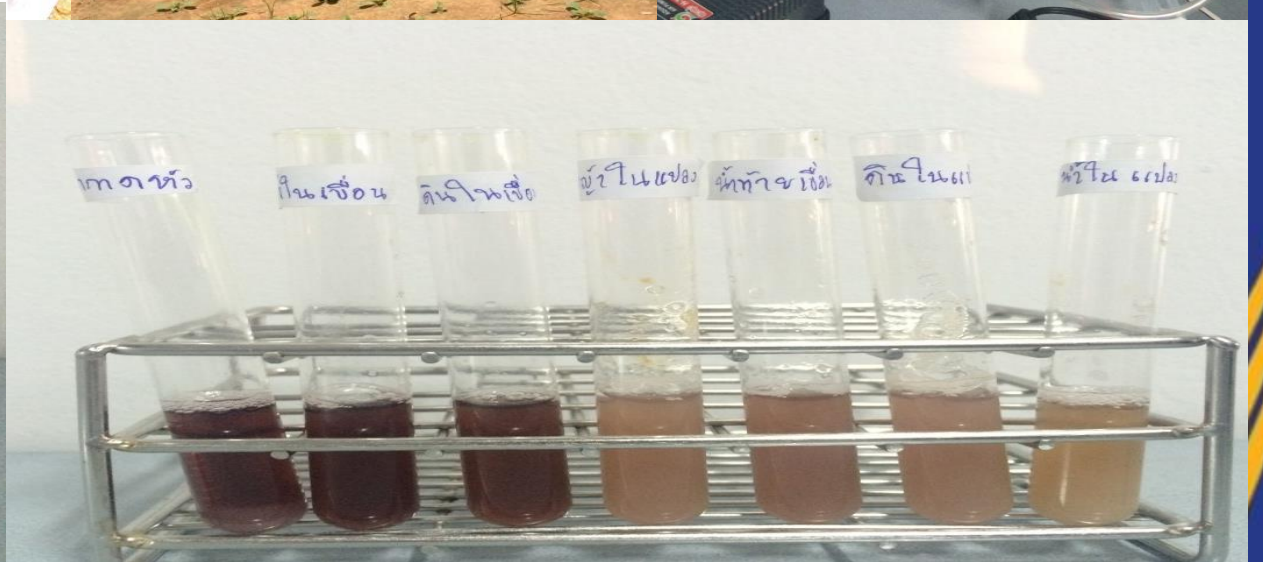
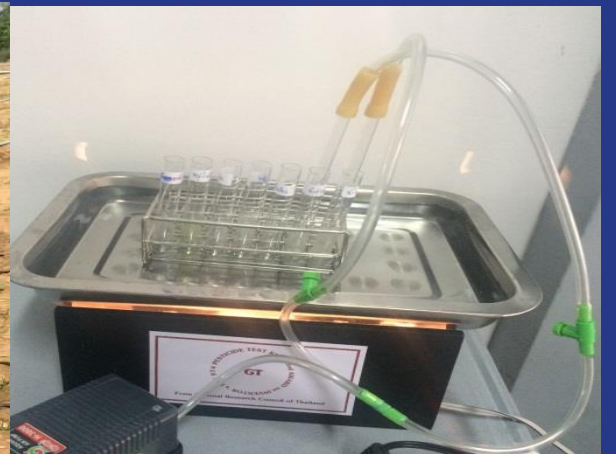
Mobilizing change and innovation

week 4 Group process





Innovation for environment





Assuring synergy

week 5-6 follow targeted health observed by health team.





Assuring synergy

week 7 problem solving through community participation





Assuring synergy

**week 8 - 10 follow up with targeted health observed
by health team**





Assuring synergy

week 11 Response to insecticide exposure questionnaire and blood cholinesterase test.





Assuring synergy

week 12 community participation and evaluation.





Data analysis

1

- **Descriptive statistics**

2

- **Chi-square test and Fisher's Exact test**

3

- **Mann-Whitney test**

4

- **Paired t – test**

5

- **Independent t – test**



Results

Part 1 : Levels of insecticide exposure and blood cholinesterase of farmers in the experimental group before and after the program

Table 1. Comparison of insecticide exposure and blood cholinesterase of experimental and control groups. (n = 49)

Variable	Before		After		T	p-value
	Mean	S.D.	Mean	S.D.		
experimental group (n =25)						
insecticide exposure	38.52	4.29	28.80	2.45	10.924	<.001
blood cholinesterase	7.01	2.35	6.59	2.60	1.315	.201
control group (n =24)						
insecticide exposure	40.83	3.19	38.21	1.89	4.502	<.001
blood cholinesterase	7.16	2.03	7.46	1.90	-1.223	.234



Results

Part 2: Levels of insecticide exposure and blood cholinesterase of farmers in the experimental group and the control group before and after the program

Table 2. Comparison of the mean difference level of insecticide exposure between experimental and control groups. (n = 49)

Variable	difference score of insecticide exposure		T	p-value
	Mean difference	S.D.		
experimental group (n =25)	9.72	4.45	6.612	<.001
control group (n =24)	2.63	2.86		



Results

Table 3. Comparison of the mean blood cholinesterase between experimental and control groups. (n = 49)

Variable	experimental group (n =25)		control group (n =24)		t	p-value
	Mean	S.D.	Mean	S.D.		
Blood cholinesterase						
Before	7.01	2.35	7.16	2.03	-.245	.807
After	6.59	2.60	7.46	1.90	-1.343	.186



Conclusion



After the program, the level of insecticide exposure in the experimental group was lower than the control group with statistical significance ($p < .001$)



After the program, Blood cholinesterase level of farmers in the experimental group were not different from those before the program with statistical significance ($p > .05$)



After the program, Blood cholinesterase level of farmers in the experimental group and the control group were not different with statistical significance ($p > .05$)



Recommendations

For nursing practices

Community nurse practitioners could apply the RAMA Model to devise a proactive nursing practice guideline for provision of care at the farmers' health clinic.





Recommendations

For nursing research

Further research should be undertaken with farmers who started their farming cycle at the same time to better control the duration, frequency, and amount of insecticide exposure. Research should be carried out to follow up the long-term outcomes of the insecticide exposure prevention program to ensure sustainability.



THANK YOU

FOR YOUR KIND ATTENTION

