

CHAPTER I

INTRODUCTION

1.1 Background and Significance of the problem

Thailand is currently the second-leading country in exporting rice products to the world market and one of the biggest users of pesticides in the South Asia region (Clark, 1997). In Thailand, most pesticides are used in rice farming. The rice farmers use them with their expectation to kill insect and grass, protect their crops, and get more benefit from the crops. As mentioned above, it is the main reason that induces this researcher's interest in pesticide use among farmers, especially rice farmers. Moreover, it raises two main questions: 1. How do Thai rice farmers practice preventive behaviors regarding pesticide exposure?, 2. What are the factors that influence their practicing these behaviors, and that influence occurrence of pesticide-related symptoms? These questions are important and necessary to address.

Pesticides are widely available in Thailand. The “green revolution” has resulted in immense agricultural productivity throughout the world over the past half century. An important part of the technological innovations accompanying this revolution is the introduction of a variety of chemicals generically known as “pesticide” in the farming areas. Moreover, under “liberalization” of the trade system, many pesticides were imported into Thailand for using with commercial planting in agricultural farms. Pesticides are sold in market with more than 2,000 brand names. However, two types of pesticide are mostly used, namely insecticide (51%) and

herbicide (38%). This remains true even though since 1997 82 kinds of pesticides have already been banned in Thailand (Integrated Pest Management [IPM], 2005).

Many kinds of pesticides are widely used for killing insects and unwanted plants in many aspects of rice farming. The reasons to explain why the pesticides are popularly used by the rice farmer are that farmers are at risk of losing crops because of attacking from insects, and competing of weeds with their crops. Furthermore, with the availability of pesticide products at many shops with low price, its quick functional killing insects and unwanted plants, pesticides are widely used.

Pesticides can cause a lot of dangers or harmful effects to users if farmers use them inappropriately. The acute effects of pesticide exposure range from mild to fatal. They may include symptoms such as skin reactions and eye burns, headache, nausea, blurred vision, muscle cramping, vomiting, and difficult breathing. Information on the chronic health effects of pesticides suggests that they might be carcinogenic (World Health Organization [WHO], 1990), although this has not yet been proved.

From reviewing many data from the past to present, it was found that the Thai farmers, especially the rice farmers, still use pesticide inappropriately. Statistics from the Ministry of Public Health on occupational poisoning show some decreasing number from a high of 5,154 in 1989 to 3,165 in 1994 although there has been no change in the type of pesticides used or the application of technology. The study estimated that there could be up to 39,600 pesticide-poisoning cases per year (Ministry of Public Health [MOPH], 2003). Researchers found that approximately

half of Thai farmers employ it in higher dose than recommended concentrations. They applied pesticides without protective clothing, and applied them unduly frequently (MOPH, 2003). Many of the sprayers were women. The studies, 80% of women were reported with symptoms of acute pesticide poisoning including dizziness, muscular pain, headache, nausea, weakness, and difficulty breathing. For the first half of 1996, 1,760 people were admitted to hospital and 16 people died (MOPH, 2003).

The problem of inappropriate pesticides usage among agriculturist farmers is an important concern for the Ministry of Agriculture (MOPH, 1998). Pesticide use within the year before enrollment was not associated with symptom count. Only associations with insecticides and fumigants persisted when all four-pesticide groups were examined simultaneously. Among chemical classes of insecticides, associations were strongest for organophosphates and organochlorines. Associations with cumulative exposure persisted after excluding individuals who had a history of pesticide poisoning or had experienced an event involving high personal pesticide exposure (Kammel et al., 2005). These results suggest that self-reported neurological symptoms are associated with cumulative exposure to moderate levels of fumigants and organophosphate and organochlorine insecticides, regardless of recent exposure or history of poisoning (Kammel et al., 2005). In Thailand, it is not known how long symptoms persist after exposure. I have explored this issue in my research

Although pesticide poisoning in Thailand has decreased since 1998 (Table 1), Sukhothai Province, in northern Thailand was the fourth-highest province for pesticide poisoning in Thailand in 2003 (Table 2). Most provinces with pesticide poisoning are in northern Thailand (MOPH, 2005).

Table 1: Number of case/death and Morbidity of pesticide poisoning per 100,000 population among 1998 - 2004, from Epidemiology of Surveillance system (506), Bureau of Epidemiology, Ministry of Public Health.

Year	Number		Morbidity rate/100,000 pop.
	Case	Death	
1998	4398	15	7.15
1999	3930	30	6.39
2000	3109	21	5.03
2001	2653	15	4.27
2002	2571	11	4.04
2003	2349	6	3.76
2004	1864	9	2.98

Source: Bureau of Epidemiology, Ministry of Public Health. (2005).

Retrieved 13 September 2005 from <http://epid.moph.go.th/>

Table 2: Morbidity rate of pesticide poisoning per 100,000 populations in 2003 by province, from Epidemiology of Surveillance system (506), Bureau of Epidemiology, Ministry of Public Health, Thailand

Province	Region	Rate per 100,000 pop.
1.Uthai Thani	Central	44.11
2.Phichit	North	23.70
3.Kampangphet	North	20.36
4.Sukhothai	North	20.22
5.Nakhon Sawan	North	19.40
6.Phetchabun	North	18.70
7.Phisnuloke	North	15.33
8.Phetchaburi	Central	8.23

Source: Bureau of Epidemiology, Ministry of Public Health, (2005).

Retrieved 13 September 2005 from <http://epid.moph.go.th/>

I am a public health worker, who provides the medical care, health promotion and rehabilitation for people, and has realized that health problems of farmers from pesticides substance tend to increase in the future in accordance with the change in society and technology which are disadvantage to health and economy of farmers and country. There are efforts in raising awareness against the hazard from using pesticide substance, but little success, even though good protection should be made through cooperation among farmers. In term of surveillance system, health providers should not only prevent and treat acute signs and symptoms but also prevent and treat chronic signs and symptoms and illnesses.

1.2 Research Question

1. What is the nature and frequency of pesticide-related symptoms in rice farmers in Kongkrait District, Sukhothai Province?
 - a.) What is the relationship between pesticide use and short-term symptoms among rice farmers?
 - b.) What is the relationship between pesticide use history and long-term symptoms among rice farmers?
2. What is the relationship between other factors (for example demographic, behavioral, and economic factors) and symptoms?
3. Do the relationships with these other factors confound any observed relationship of pesticide use history and symptoms among rice farmers?
4. How frequently do symptoms persist after most recent use of pesticides?

1.3 Research Objectives

To ascertain relationship between pesticide use history and illness and symptoms among rice farmers.

Specific objective

1. To ascertain relationship between pesticide use history and acute or short-term symptoms among rice farmers.
2. To ascertain the relationship between pesticide use history and medium-term and long-term symptoms among rice farmers.
3. To ascertain the association between practice in pesticide use and relationship between other factors (for example demographic, behavioral, economic and environmental factors) and symptoms among rice farmers.

4. To ascertain whether relationships with these other factors confound any observed relationship of pesticide use history and symptoms among rice farmers.
5. To ascertain the frequency of persistent symptoms in rice farmers.

1.4. Research Hypotheses

1. Practices in pesticide use have a relationship with history and symptoms.

They were included 9 factors as follows:

- 1.1 Frequency of pesticide use.
- 1.2 Concentration of pesticide used.
- 1.3 Duration of each pesticide use.
- 1.4 Method of pesticide use.
- 1.5 Duration since most recent exposure to pesticides.
- 1.6 Duty in handling of pesticide use.
- 1.7 Number of pesticides mixed for applying.
- 1.8 Duration of using pesticides as rice farmer.
- 1.9 Training in pesticides use.

2. Practice in self-protection has a relationship with pesticide-related symptoms.

1.5 Conceptual Framework

This study is identified the association between socio-demographic factors and pesticide related, and history of acute and chronic symptoms. This arrangement of independent variables and dependent variable is show in figure 1.

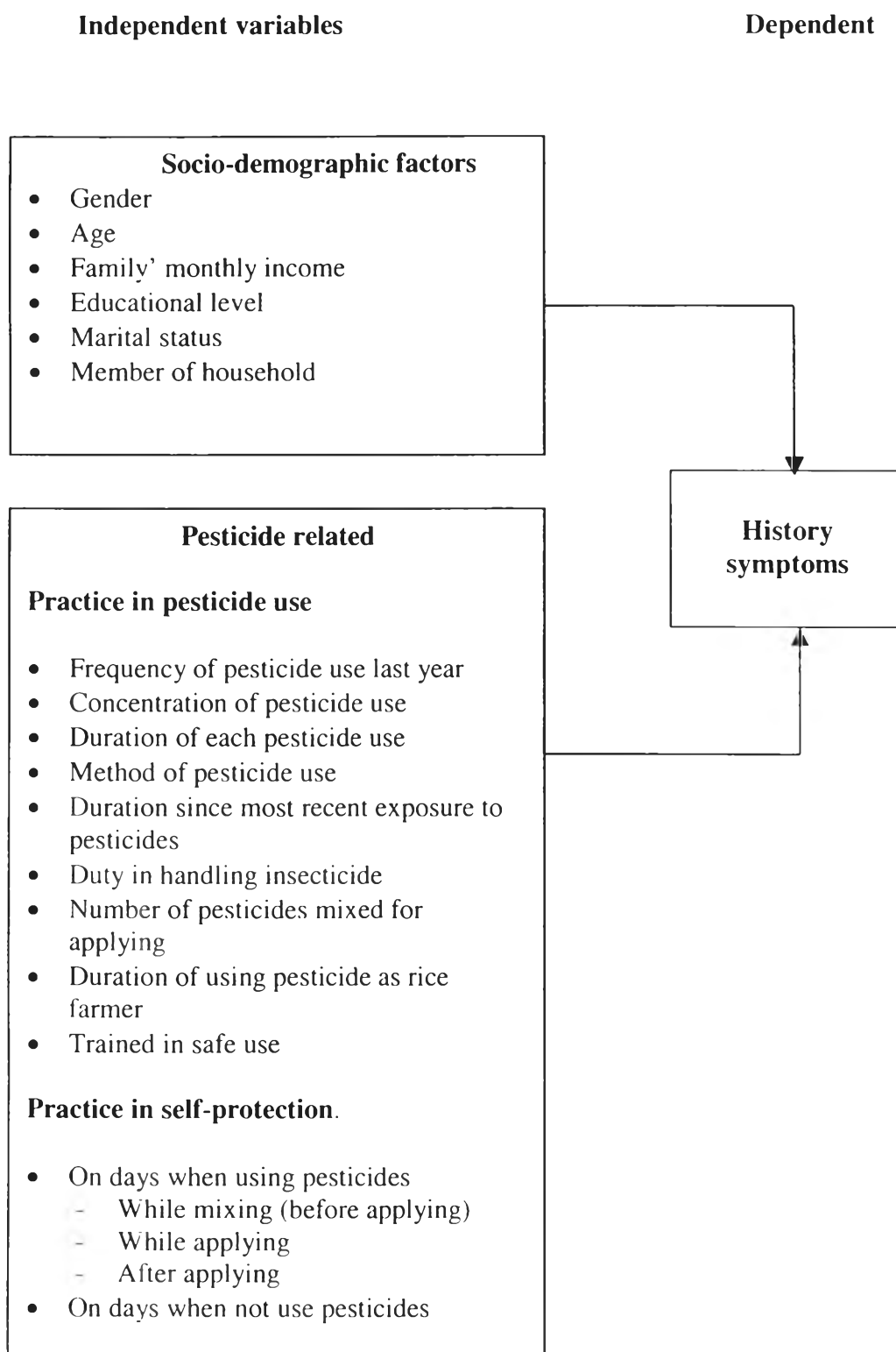


Figure 1: Conceptual framework

1.6 Variables to be studied

The following variables are studied in this research.

Independent Variables

Socio-demographic data: refer to gender, age, family' monthly income, educational level, marital status, and member of household.

Pesticide use factors: refer to practice in pesticide use such as frequency of pesticide use, concentration of pesticide used, duration of pesticide use, method of pesticide use, duration since most resent exposure to pesticides, duty in handling insecticide, Number of pesticides mixed each applying, duration of using pesticide as rice farmer, and training in safe use of pesticides and practice in self-protection before, during, and after applying pesticides, and on days when not using pesticides.

Dependent variables

History of acute and chronic symptoms

History of immediate or acute symptoms: refer to the symptoms immediately and after used pesticide in 24 hours.

Medium-term and chronic symptoms and illness: refer to the symptoms of longer duration after pesticide use including ever within last year, last six month, last month, and last week.

1.6.1 Operational Definitions

Rice farmers are a field worker equal or more than 15 years of age, and work in the rice farm. Their fieldwork must include the exposure to pesticide, such as mixing and applying pesticides in the field.

Pesticide means all chemicals used for pest control. Pesticides are classified according to the type of pest they are active against such as insecticides, herbicides, fungicides, acaricides, rodenticides, nematocides and algicides.

Frequency of pesticide use means the number of days to use pesticides that farmers apply last year.

Concentration of pesticide used means 3 recommendations of pesticides use that farmer's use including less than recommended, recommended, and more than recommended.

Number of pesticides mixed for applying means mixing two or more pesticides, and using only one pesticide.

Method of pesticide use means the pattern or characteristics in pesticide use of farmers that uses for destroying pesticides such as spraying, scattering or mixing.

Duration since most recent exposure to pesticides means the number of days between the last exposures to pesticides.

Duration of each applying episode means the number of hours per each episode of spraying pesticide.

Duty in handling pesticide means the role of responsibility concerning the application of pesticides such as mixing pesticides, spraying pesticides, mixing and spraying pesticides together. Preparing pesticides or other responsibilities in all activities of pesticide use.

Duration of using pesticides as rice farmer means the number of years that using as rice farmer and expose to pesticides

Practice of self - protection means to appropriate actions employed by the farmers before, during, and after applying pesticides, and on days when not using pesticides, that aims to protect themselves from harmful effects of pesticides.

1.7 Expected outcome and benefits

1. Can be used as base line data to improve the projects that aim to tackle the problems of inappropriate pesticide usage.
2. To provide a scientific basis of policy that reduces harmful health effect from pesticide use in agriculture workers.
3. To help provide surveillance systems in short term and long term effect of pesticide in Thailand.
4. To provide support for health promotion and prevention in acute poisoning symptoms and chronic illness of pesticide use.