CHEAPTER V

DISCUSSION

The aim of this study was to evaluate the association between cholinesterase level and knowledge, attitude, and practice associated with pesticide use and exposure of farmers at Nang Ler sub-district in Chainart province, Thailand. There were 98 participants.

5.1 Socio-Demographics

In this study, the results showed that mostly of the participants were female 55.1% and 44.9% were male. They had the ranged of age from 18-65 years. The average age of the participants was 46 years with a standard deviation of 12.3. There was similarly in the study of Raksanam et al., (2012); the average age of the participants was 45 years with a standard deviation of 10.3.

The mostly of the respondents were in the range of 51-60 (31.6%) and another range was 41-50 years (26.5%). The study in Pathumthani province, Thailand (Un Mei Pan, 2010) was also showed the most of average age on range of age from 31 – 50. In this study had 52% of participants who have an occupational on using pesticides by themselves (spraying, mixing, and loading). Approximately, 60% of them applied pesticides more than 10 years, there was similarly in the study of Un Mei Pan, (2010).

In this study, mostly of participants (55.1%) had educated in primary school that was similarly in the study of Raksanam et al., (2012); more than 50% of participants had educated in primary school. In Nepal was also reported that mostly of female (80%) and male (50%) had less than 8 years of education (Atreya, 2007). This situation was presented because they had learnt the knowledge and experience from

their family. So most of the farmers in the study had educated in primary school and have a little number of farmers that had educated on the other.

5.2 Information regarding pesticides use

In this study, the mostly of problem of rice farmers was form insects (99.0%), weed (94.9%), plant diseases (77.6%), and animal disease (55.1%), respectively. The common pesticide uses were abamectin, Organophosphate (chlorpyrifos), Carbamate (carbosunfan, carbofuran). There was similar in the research of Raksanam et al., (2012); the popular pesticides used in rice farms were abamectin, Organophosphate (chlorpyrifos), Carbamate (carbosunfan, carbofuran) because the mostly problem of rice farmers in this area was pest such as insect and plant louse. In the research of Sematong et al., (2008), they found that the most farmers used pesticides in their activity on farm and the mostly common of pesticide used were herbicides and insecticides (chlopyrifos).

The mostly of farmers were got the information of pesticide from the technicians (Agriculture officer 56%), from television (47%), from other farmers (neighbor and community header (36.5% and 35.7%, respectively), and from retailer (15%). There was similarly in the study of cottage industries (Ignatius et al., 2005). In the study of farmer in Ubonrachathani province, Thailand (Norkaew et al., 2010) was shown that the most of participants also got the information of pesticide from the agriculture officer. In these community, the committee had closely relationship with agriculture officer so it was easily to asked the information of pesticide

5.3 Information of toxicity symptom

About toxicity symptoms associated with pesticides of this study, they shown that mostly of the participants never had toxicity symptom (52%), 47% had toxicity symptom after used pesticides (33.7% of them were few symptom such as headache, fatigue, dizziness, stomach cramps and throat irritation, and 13.3% were moderate

symptom such as nausea, vomit, blur vision, shivering, cramp, hyperventilation, and constriction etc.). The study of Norkaew et al., (2010) also showed that more than of 50% of participants never had toxicity of symptom. Moreover 42.4% of participants had toxicity symptom after used pesticides.

They were provided their health by health center 77.4%, by province hospital 25.5%, by herbal use by themselves 13.7%, by district hospital 7.1% and by private clinic 6.1%, respectively. There was similarly in the study in Ubonrachathani province, Thailand (Norkaew et al., 2010); they also provided themselves by health center. In this area, health center is convenient and nearest from their farms and their homes.

5.4 Knowledge of rice farmers regarding pesticide use and prevention themselves from pesticides.

In this study, more than 80% of participants were known to used cover mask and glove, closed dressing, and wearing boots are the correct practice when have to spraying pesticide. In Ethiopia reported similar our study; the common type of PPE provided in their farms were overalls, safety shoes, respiratory, gloves and goggles (Mekonnen and Agonafir, 2001). Recena et al., (2006) also reported that found most of case, the farmers wearing hats, but less than half wearing boots, mask, glove, and clothes. In Ubonrachathani province, Thailand (Norkaew et al., 2010) was reported 89.4% of the respondents knew that they should use PPE to cover their body entirely.

They known to separate pesticide and storage in special box and close the door, and known to burn and bury pesticide packet after it was finished. Most of them known to clean material with detergent, take a bath, and change new dress after used pesticide and when they exposed pesticide. However in the study of Norkaew et al., (2010) reported that less than 50% of their participants knew separate pesticide and storage in special box and close the door, and known to burn and bury pesticide packet after it was finished.

Approximately 70% of respondents knew that pesticide can go inside the body by ingestion, inhalation and derma. There was likely with other studies which had found that most occupational exposure to pesticide (Yassin et al., 2002). In Ubonrachathani province, Thailand (Norkaew et al., 2010) also reported more than 80% of respondents knew the routes that the pesticides can pass through the body.

They knew to choose the pesticide follow the type of pest, and knew that to read the label beside product or observe risk picture and symbol for know about of toxicity of pesticide but they always choose pesticide by follow up the reasons that can kill many kind of pest because it was save their money. There was similarly in the study in Nepal (Atreya, 2007) reported nearly 80% of respondents decide themselves on types, doses, frequency and timing of pesticides to be used. Less than 20% knew about the first step to treat themselves when they got the pesticide by the oral way.

77.5% of them knew that pesticide residual in human, soil, air, and plant after spraying and more than 60% knew that pesticide was harmful to any living thing. There was similarly in the research of Recena et al., (2006) that the most of farmers know the pesticide was harmful and residual in the environmental.

Most of the participants in this study had knowledge at least moderate levels (74.5%). There was similar in the study of Yassin et al., (2002); they reported the knowledge of their respondents was high. In our study, the committee had closely relationship with agriculture officer so it was easily to ask the information of pesticide.

5.5 Attitude of rice farmers regarding pesticide use and prevention themselves from pesticides.

In this study, approximately 50% of the participants were disagree pesticides only harm insects, not in human, they considered that pesticides harmful to the human health and environment. There was similarly in a study of Raksanam et al., (2012); they indicated almost of respondents considered pesticides harmful to the health of

workers who deal directly, consumer's health and the environment and in other countries reported (Atreya, 2007 ;Yassin et al., 2002)

The farmers believed that spraying should be done in the windward direction and they have to use personal protective equipment (PPE) that was similarly in the study Brazil; they found the respondents were care of wind direction during spraying pesticides (Ateya, 2007)

Moreover 40% used sometimes pesticides more than label recommendation for increase yield. In research of Raksanam et al., (2012) found that nearly half of respondents used more than the recommended concentration. The most of farmers disagreed to mixes various pesticides for increase effectiveness and to increase amount of pesticides of use. In the study in Guza Strip found the farmers who used over recommended concentrations of pesticides and the farmers who mix two or more pesticides were got higher toxicity symptoms (Yassin et al., 2002). By the way they disagree with high cost chemicals are more effective to control pest than cheaper chemicals.

Approximately 90% respondents believed that pesticide can pass to the body more than ingestion route. In Salameh et al., (2003) reported that the farmers were aware of dermal and respiratory exposure but not of ingestion. More of them agreed about wear clothing while spraying pesticides, this was same with a study of Mekonnen and Agonafir, (2001); they reported the participants were careful working with pesticides; there was more important that using personal protective equipments (PPE). The research of Yassin et al., (2002) shown a high proportion of farm workers were more aware of inhalational and dermal absorption of pesticides than other routes of exposure agreed with other studies which have found that most occupational exposure to pesticides occur from skin absorption and through inhalation (Yassin et al., 2002).

The respondents considered with daily exercise can help to excreting pesticides out off their body through sweat. Moreover they thought that drink water or

coconut juice may help to excreted pesticides toxicity as well. The agricultural workers should access regarding attitude of pesticides use and protective measures.

For the attitude of respondent rice farmers in Nang-ler Sub-district regarding using personal protective equipment to prevent them from pesticide, the farmers had neutral attitude about pesticide use and exposure.

5.6 Practice of rice farmers regarding pesticide use and prevention themselves from pesticides.

In this study, most of the respondents were showered immediately after they sprayed pesticides; they were washed their hand and washed face with soap before having meal after using pesticide. And they checked their equipment and material before using and wore cloth while spraying.

Approximately 60% of them wear boot while spraying, wear gloves and mask when mixing pesticides and they removed cloths which was wearing when spraying immediately. Another study in Thailand reported that less than 50% of farmers used protective clothes and gear (long sleeved shirt, long pants, boot and mask) while spraying pesticides and were washed their hand or showered and washed their cloths after spraying (Sematong et al., 2008). But some reported that most of respondents reported washing their hands, changing clothes, and showering after working with pesticides.

Raksanam et al., (2012) found that the equipment used to apply the pesticides was washed with a water hose near house or in the field, using water from the river or from the wells. On the hand, a study in Nepal, moreover of respondents hadn't shower after spray. Atreya, (2007) and Faria et al., (2000) reported that in southern Brazil, over 50% of the agricultural workers reported using boots, hats, glove, masks, and thicker or impermeable clothes during pesticide application. In study in Labanon, they found that most of participants were took a shower at the end of their work shift (Salameh et al., 2003).

Approximately 80% of respondents found that never had smoking or drinking water while spraying pesticides. There was similarly in the study of Atreya, (2007); they reported that almost all males and females did not smoke, drink and eat during pesticides application. In Salameh et al., (2003) also shown that a lower proportion that the respondents agree was did not smoke during spraying application.

This study found that more than 70% of respondents read instruction label before use and mix pesticide following recommendation dose and noticed about appropriate type of pesticide. It is different in the research of Atreya (2007) reported less than half of respondents selected pesticide by neighbor recommended, advertising and price and most respondents decided themselves on types, doses, frequency and timing of pesticide to be used.

Moreover 60% of respondents were not spraying pesticides when it is windy or stormy. In term of practice regarding use of protective equipments during pesticides mixing shown that most of respondents did not mix pesticides by hand. It was related to study in Ethiopia reported during pouring and loading by hand, pesticides could also come into contact with the hand or other parts of the body of the sprayers. Pesticide exposure is increased by such inappropriate practices (Mekonnen and Agonafir , 2001).

Approximately 60% of respondents burned or buries the empty pesticide containers. About 70% of them were cleaning pesticide applicators with detergent before storage. More than 80% of farmers did not discard pesticide containers in the river after used. And less than 30% of participants were cleaning pesticide containers in the river after used. A study in Lebanon reported the proportion of good practice represented less than half of individuals' habits. The majority of them discarded pesticide container wastes into the environment (soil or water) or with other trash and few of them used containers for storing water or food (Salameh et al., 2003). Atreya (2007) found more than half females and 38% of males used pesticide-contaminated utensils for other purposes, for example in latrine, livestrock and in kitchen. Moreover, Recena et al. (2006) found the most farmers disposed the empty pesticide

container within the farm by burned,burying,leaving it in the field, or reutililization for other purposes and some farms were taken to the local waste containers.

For the practice of the rice farmers in Nang-ler Sub-district shown that more than 70% of respondents had fair practice regarding using personal protective equipment to prevent them from pesticide exposure.

5.7 Cholinesterase level of the respondents

The average of AChE between direct exposed farmers and indirect exposed farmers were significant (p-value = 0.001). The study of Elhalwagy et al., (2010) about the duration of exposure to pesticide revealed that chronic exposure to pesticides induced significant reduction in serum AChE with respect to the controls and the two types of spraying persons.

The average of PChE between direct exposed farmers and indirect exposed farmers were not significant (p-value = 0.145). There was similarly in the research of Carbonell et al., (1995); the PChE level in the agricultural workers group during the period of major exposure with respect to the period of minor exposure, these values were not significantly different when compared to the average level obtained in the pooled control.

The AChE in Red blood cell cholinesterase is identical to the enzyme found in the nervous system, and it is thought to be a good indicator of actual neuronal activity. The turnover rate for red blood cells is slow (about 3 months), and AChE measurements reflect this slow replacement rate. Thus, AChE is typically used as a marker of chronic exposure. In contrast, PChE turnover is much quicker. PChE is a better short-term indicator due to its more rapid response to exposure; it is used as an indicator of recent, acute exposure (Brown et. al., 2006).

In this study, we compared group of farmers in the same area, so result of both groups of the short-term exposure (PChE) might similar. Raksanam et al., (2012) reported that sometimes the sprayer sprayed with another person working close by,

who could inhale the spray carried on the wind. However, the long-term exposure depended on the time, so the difference activity had an effect on AChE.

5.8 Association between knowledge and attitude, knowledge and practice, and attitude and practice

All of the participants in this study, the association between knowledge and attitude, and attitude and practice were low positive correlation (Spearman's rank correlation coefficients 0.014, and 0.015, respectively). And the association between knowledge and practice was moderate positive correlation (Spearman's rank correlation coefficients 0.522, p-value < 0.001).

According to the socio-demographics part, most of participants had graduated from primary school, but their families were farmers for long time. And in the part of information regarding pesticide use showed that approximately 50% of the participants got the information of pesticide from the technician (agriculture officer). So the most respondents had a moderate level of knowledge. These may be the reason to fain other alternatives for pest control.

Most of respondents were based on learning from the technician. Example of these included don't over mixture more than pesticide's label recommendation, don't stand above the wind when spaying pesticide, and should wear the clothes. Furthermore, high percentage of participants not believed in attitudes statement may encourage farmers to be concern to use of protective measures.

In general, the farmers were aware of practice for safe uses include read and followed label and instruction of pesticide, wear gloves and marks when spraying and mixing pesticide, don't mix pesticide by hand. Even though the participants had to awareness of the pesticide could harmful to their health. Moreover, a higher percentage in negative statement of rice farmers were mixes various pesticides for increase effective eradication of weed and pest. This practice could put the general population at risk

The direct exposed farmers in this study shown the association between knowledge and attitude, and attitude and practice were low positive correlation (Spearman's rank correlation coefficients 0.105, and 0.008, respectively). The association between knowledge and practice were low positive correlation (Spearman's rank correlation coefficients 0.412, p-value < 0.001).

The indirectly exposed farmers shown the knowledge and attitude, and attitude and practice were low negative correlation (Spearman's rank correlation coefficients -0.054, and -0.067, respectively). And the association between knowledge and practice was moderate positive correlation (Spearman's rank correlation coefficients 0.622, p-value < 0.001). The cause of association between knowledge and attitude, and attitude and practice were low negative correlation might be the non-directly exposed farmers should not used pesticide by themselves. So they might have unconcern attitude in their own.

5.9 Association of cholinesterase level in blood of direct exposed farmers and indirect exposed farmers between ages, sex, education years, and duration time as farmers, knowledge, attitude, and practice.

One of the studies in Nepal (Atreya, 2007) showed that there was a significant positive relationship between age, sex, years using pesticide and cholinesterase level. By the way in our study the associations between four characteristics (age, sex, education years, and duration time be farmer) and AChE in the direct exposed farmers were not significant but in indirect exposed farmers, the association between AChE and Age, and AChE and duration time being farmers were significant negative correlation. The associations between four characteristics and PChE in the direct exposed farmers and indirect exposed farmers were not significant.

The associations among three variables (knowledge, attitude and practice) and AChE in both of the direct exposed farmers and indirect exposed farmers were not significant. Whereas, the associations between PChE of indirect exposed farmers with knowledge were significant positive correlation.

In term of PChE, their turnover is much quicker. PChE is a better short-term indicator due to its more rapid response to exposure; it is used as an indicator of recent, acute exposure (Brown et. al., 2006). In the direct exposed farmers, they exposed the pesticides every day (spraying and mixing farmers). So knowledge, attitude and practice had little influence for them. But indirect exposed farmers were hardly exposed the pesticides, so knowledge was important. And in the correlation part, the association between knowledge and practice was moderate positive correlation. There might affect to PChE level.

In case of AChE turnover rate for red blood cells is slow (about 3 months), and AChE measurements reflect this slow replacement rate. AChE is typically used as a marker of chronic exposure so indirect exposed farmers might get the exposure of pesticide by environmental. There was similarly in the study of Raksanam et al., (2012); sometimes the farmers who spraying pesticide sprayed with another person working close by, who could inhale the spray, carried on the wind so non-directly exposed might get risk.