

CHAPTER II

LITERATURE REVIEW

This research evaluated the study of the effectiveness of participatory learning program on pesticide utilization among agriculturists in Srinakorn district, Sukhothai province. Reviews of literature are as follows: (1) pesticide, (2) knowledge, attitude, and practice, and (3) leaning theory and participatory learning.

2.1 Pesticide

Chemical control of pests and weeds aimed at minimizing losses has been introduced throughout the world. A wide range of pesticide utilization has become important in agriculture, mainly in developed countries, but also increasingly in developing countries (WHO, 1990b).

The following is simple definition given in clear terms intended for primary health workers. "Pesticides" are chemicals intended to kill "pests" (insects, fungi, weeds, rodents, etc.). The chemicals kill pests by stopping or changing their normal life processes. Furthermore, various degrees of illness or death can occur in human when exposing to chemicals. For this reason, pesticides must be handled with great care (WHO, 1990a)

2.1.1 Pesticide Use Problems

It is often observed that agriculturists, major pesticide users, are not fully aware of the risks related to pesticide use (Rola, 1993). A study of 1,672 agriculturists in Thailand reported that 95.7% of them did not use proper protective equipments, 32.6% ate food and drank water while spraying, 21.0% sprayed pesticides all day long, and 20.6% harvested their vegetables before the specified safe dates after spraying (Siripuchaka, 1998).

2.1.2 Pesticide Health Problems

Regarding human health problems, pesticides could enter the body through 3 channels which are skin contact, ingestion, and inhalation (Jeyaratnam, 1990). Pesticide would be accumulated in the body and the symptom would be shown after the poison level was high enough (Forget, 1991). Danger from constantly exposing to pesticides was the cause of several diseases such as heart disease, nervous disease, hepatopathy, and nephropathy (Forget, 1991). Forget also reported that a high level of exposure to pesticides would increase a risk of paralysis and respiratory cancer and even immediate death in the worst case.

From the study at two farms in northwest Ethiopia in 2004 about pesticide use on agricultural fields and health problems in various activities, the result were that the farm workers had respiratory symptoms of cough, phlegm and wheezing (Ejigu & Mekonnen, 2005). Respiratory symptoms in the farm workers revealed that cough phlegm and wheezing at Ayehu farm were significantly ($p < 0.05$) higher than

the controls. In addition, liver function tests showed of subjects at Ayehu farm were worsen than the controls.

The pesticide is dangerous not only for direct users but also for residents living nearby since farms in surrounding areas may be exposed to pesticide sprays in the air (WHO, 1990b). Water and food may also be contaminated. Consumers far away form farming areas may eat crops or animal product, or drink water, contaminated with pesticide residues.

2.2 Knowledge, Attitude, and Practice

A clear understanding of agriculturists' knowledge, attitudes, and practices regarding pesticide use should be the first step toward understanding the reasons for misuse of pesticides by agriculturists.

2.2.1 Knowledge

Knowledge was defined as "the information and understanding that you have gained through learning or experience" (Longman, 1999). Knowledge can be classified in to 6 levels: (1) knowledge or recall, (2) comprehension or understanding, (3) evaluation, (4) analysis, (5) synthesis, and (6) application (Bloom et al., 1975).

A knowledge evaluation test is the measurement of the brain's capability in memorizing things that have been experienced, known, or seen. There are many types of tools used in the evaluation, in which each type is appropriate with

different characteristics. The tool could be divided into the 3 following types (Vungpanich, 1983).

(1) Oral test is a direct verbal test between a tester and a participant. Sometimes this could be referred to as an interview.

(2) Practice test is the test that does not want participants to respond verbally or in writing but emphasizes real actions.

(3) Writing test is divided into 2 types.

(3.1) Essay (Open-ended questions) is the type that requires participants to explain, describe, or criticize events according to their knowledge.

(3.2) Limited answers (Close-ended question) is the type that requires participants to consider, compare, and interpret statements or details. Participants either answer true/false questions, fill in the blanks, match choices, or select the best answer from multiple choice.

Close-ended questions with pre-defined answers are preferable for because it is easy to administer. Using close-ended questions are also quicker and cheaper to analyze, as they do not involve the subsequent analysis of replies before a suitable coding frame can be developed (Bowling, 2004). Therefore, this study will use close-ended questions to measure the knowledge.

2.2.2 Attitude

Attitude was defined as “ the opinions and feelings that you usually have about a particular thing, idea, or person” (Longman, 1999). Attitude was

classified into 3 components: (1) affective component, (2) cognitive component, and (3) behavior component (Aronson et al., 2005).

A tool used in attitude evaluation is called the rating scale. The attitude scale is composed of 2 parts, which are the attitude statement part and the reply part. There are many types of rating scale, i.e. Thurston-type scale, Likert scale, and Guttman scale. Each of these scales has different benefits, limits, and appropriateness for use in assessing attitude. Therefore, the choice of attitude scale depends on the situation and the scope of research (Phoompark, 1980).

Thurston-type scale and Guttman scale are comparative method, in which subjects choose among a series of alternatives that have been previously calibrated by a separate criterion. The comparative methods require considerably more time to develop than Likert scale which is a direct estimation technique. (Streiner & Norman, 2003).

Likert scale is one kind of direct estimation techniques, in which subjects are required to indicate their response by marking on a line or checking in a box. Direct estimation techniques, in various forms, are pervasive in research involving subjective judgments. They are relatively easy to design and are easily understood by subjects. Researchers frequently use Likert scale to measure agreement (Strongly agree to Strongly disagree), but it is possible to construct a Likert scale to measure almost any attribute, such as acceptance (most agreeable to least agreeable),

similarity (most like me to least like me), or probability (most likely to least likely) (Streiner & Norman, 2003).

2.2.3 Practice

Practice was defined as “regular activity that you do in order to improve a skill or ability” (Longman, 1999). The practice behavior of human results from attitude, social norms, personality, and the expected outcome of a particular person (Suvan, 1983).

Practice evaluation requires great observation, both in the process and the action outcome. Equipment used in observation is checklist, which is one of the standards for recording observational information (Suvan, 1983).

2.2.4 Relationship between knowledge, attitude, and practice

Knowledge, attitude, and practice are all correlated with one another. Schwartz suggested a relationship model between knowledge, attitude, and practice as shown in Figure 2 (Schwartz, 1975).

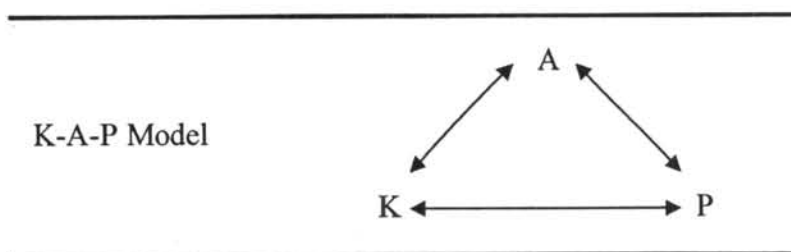


Figure 2: Knowledge-Attitude-Practices Model, from Nancy E. Schwartz; 1975. p30.

The Knowledge-Attitude-Practices Model was applied in the study of Dithesawatvate (1991). He studied about the factors associated with behavior of using pesticides among agriculturalists in Maharakam province. The result showed that the significant factors related to behaviors of pesticide use in descending order were knowledge, attitude, history of allergy to pesticides, history of pesticide training, frequency of using pesticides per month, and duration of using pesticides. This model was also applied to the study of Pimonlikit (1996). He studied about the factors affecting knowledge and behavior in utilization of pesticides among farmers in Tumbon Bangplub, Songphinong district, Suphanburi province, The study found a high correlation between knowledge and practice in using pesticides.

From the studies above, it shows that the 3 components (knowledge, attitude and practice) are closely related to one another. One can not be independent of the others. The promotion of one component should help promote the other two components as well. Therefore, the development of one component should also indirectly develop other components.

2.3 Learning Theory and Participatory Learning

In the past, health staff provided health related information and knowledge through many methods such as personal advice, group teaching/ tutorials, and distribution of information leaflets to people who come to health centers. These methods provide only one-way communication from the staff to people without interaction between the providers and receivers.

A learning process called participatory learning was developed to focus on learners as the learning center (Kolb et al., 1991). He proposed that experience is a source of learning and development.

The purposes of participatory learning were to promote the presence of precursors to health behavior and to assist participants in making appropriate health related decisions. Participants could make decisions about personal health behaviors, use of available health resources, and societal health issues (Clark, 1992).

The strength of participatory learning is that participants learn to trust their own judgments and at the same time appreciate other people's rights and opinions (Ewles, 1996). Participatory learning uses a flexible approach and a variety of methods that fit with the community and it is the method that facilitates the empowerment of individuals, groups or community (Naidoo & Wills, 1994). The principles of participatory learning are two-way communication, no lecture, no interruption, no domination or leading, using various activities, and working in small group (Naidoo & Wills, 1994). A primary structure of participatory learning comprises of an experiential learning process in combination with a group process (Department of Mental Health, Ministry of Public Health, 2000).

2.3.1 Principles of Experiential learning

Experiential learning refers to learning in which teachers aim to help learners learn from their past experiences, and has the following 5 characteristics:

1. It is learning which is based on experiences of learners.
2. It creates a continuous and challenging learning experience, and it is active learning, in which learners must participate in activities all the times instead of listening to a lecture.
3. There is an interaction between learners and teachers and among learners themselves.
4. There are interactions that result in expansion of learner's knowledge.
5. It depends on types of communication patterns, such as speaking or writing, which are favorable to exchange, analysis, synthesis, and learning.

The experiential learning consists of 4 components.

1. Experience: a teacher helps learners bring their own experience to develop the organization of knowledge.
2. Reflection and discussion: a teacher helps learners to have opportunities in expressing their ideas so that they learners exchange opinions and learn from each other.
3. Understanding and conceptualization: learners understand and lead them to conceptualization. This may happen in different ways, for example, learners initiate the idea, which would then be fleshed out by a teacher, or a teacher initiates and learners flesh out to reach conceptualization.
4. Experiment/Application: learners use newly offered messages in different situation until they become the learner's own way of practice.

It can be concluded that experiential learning refers to learning that aims to enable group members to create knowledge through effective communication based on previous experiences, by adapting themselves to create new knowledge through modification of attitudes, dissemination of new bodies of knowledge, and exchange of information to broaden the scope of existing knowledge.

2.3.2 Group Process

Learning through group process is important because it provides learners with maximum participation. Maximum participation depends on group design, varying from two members to a large group with many members. Each type of group has its own strengths and weaknesses.

According to the principles of participatory learning are: two-way communication, no lecture, no interruption, no domination or leading, using various activities, and working in small group (Naidoo & Wills, 1994). Particularly, working in small group has the advantages as follows:

1. Enhances participant motivation and fosters positive attitudes toward the subject matter, participants enjoy working together in small groups.
2. Develops participants' problem-solving and decision-making skills.
3. Enables participants to share their ideas with other participants for critiquing and comparison.

Participatory learning is the important process to solve occupational health leading to good health. For instance, Elkind et al. (2002) and Zalk (2001) used

the participatory ergonomic intervention techniques to prove and to be beneficial in the prevention of musculoskeletal disorders. Kawakami & Kogi (2001) found that participatory, action-oriented training tools such as action-checklists, local good example photos, and group work methods played key roles in the effective implementation of the programs. Kawakami et al. (2004) used the POSITIVE (Participation-Oriented Safety Improvements by Trade Union Initiative) program included collecting local good examples in safety and health, developing an action-checklist, testing a participatory training program, and conducting follow-up activities to examine local achievements. Training manuals were compiled to provide workers with the practical, easy-to-understand information on safety and health improvements and on the positive roles of trade unions. Tandhanskul et al. (1995) adopted a new program of action which emphasizes participation, a positive approach and locally made solutions. The program consisted of the following steps. (1) A demonstration training session was conducted to motivate the enterprises' representatives to take action. Locally invented improvement examples were presented and small group discussion was organized for facilitating their action. (2) The participants were encouraged to use a checklist for assessing safety, health and ergonomic risks in their own workplaces. Concrete action plans were established based on their checklist results. (3) The improvement action started, in which step-by-step approaches were emphasized.

Srikam (2001) studied about the behavior change of pesticide use using a participatory approach in Trakanphutphon district, Unbonratchathani province, the

study group composed of 50 farmers. The results on pesticide knowledge showed that the participants' mean score was 6.16 points at baseline compared to that of 10.74 points after the participatory learning. The results on pesticide attitude showed that the participants' mean score was 19.46 points at baseline compared to that of 20.36 points after the participatory learning. The results on pesticide skills showed that the participants' mean score was 23.26 points at baseline compared to that of 27.04 points after the participatory learning. Statistical comparison indicated significant difference between before and after data ($P < 0.05$). It can be conclude that the pesticide knowledge, attitude, and practice skills of the participants were improved.

Pitaswad (2003) studied about the environmental health model (EHM) of pesticide utilization for sustainable agriculture in Donka sub-district, Bangpae district, Ratchaburi province. EHM of pesticide utilization was developed and implemented to a core group of 33 volunteer farmers selected by community votes to be trained to be environmental health team leaders (EHTL). The study found that the participatory training program was effective. EHTL significantly increased scores of KAP especially behaviors of storing and spraying the pesticides. Knowledge and technology from the training were transferred to the neighboring farmers who finally altered their behaviors and saved a lot of expenses.

Janhong et al. (2005) studied about health promotion program for the safe use of pesticides, the purpose of this study was to determine the knowledge, attitudes and practices (KAP) concerning the safe use of pesticides of Thai farmers in

Don Kha sub-district, Bang Phae district, Ratchaburi province. Thirty-three voluntary Thai farmers of thirty-three farming families, recruited by convenience sampling, participated in a training program for six months. Data were collected by questionnaire interviews, and KAP on the safe use of pesticides were compared by paired t-test. Research findings showed that the mean scores of KAP in the posttest were significantly higher than the pretest.

Perry and Layde (2003) studied about farm pesticides: outcomes of a randomized controlled intervention to reduce risks, A randomized controlled design was used with random selection of participants, random assignment to intervention and control groups, and baseline and post intervention assessments. Four hundred Wisconsin dairy farmers certified to apply pesticides to field crops were recruited to participate over a 1-year evaluation period. Three-hour educational sessions were conducted with approximately 100 randomly assigned participants. Sessions targeted four educational messages: (1) existing evidence of excess cancers among farmers, (2) simulation of pesticide exposure presented through slide show and description, (3) feedback of self-reported data collected from the farmers reporting on frequency of exposure and gear use, and (4) cognitive behavioral strategies that can be adopted to reduce pesticide hazards. Six-month post intervention analyses showed that an educational intervention had significant effects on the use of gloves and gear during the most recent application and an actual reduction in the total number of pesticides used.

Furthermore, participatory learning not only solves the agricultural occupational health problem but it also solves other health problems. For instance, Chusri (2002) used the participatory learning to improve knowledge, attitude and practice in tuberculosis prevention and care among HIV self-help group in Bangkok. Promphuk (2001) adapted the participatory learning in the training program for increasing cervical cancer screening at Linfa sub-district, Chaturaphukphiman district, Roi-Et province. Puangdownreong (2005) used the participatory learning to solve dengue haemorrhagic fever in Ban Korang, Bangteay sub-district, Sampran district, Nakornpathom province. Sriputtha (2002) used the participatory learning to improved knowledge, attitude and practice on sexually transmitted diseases in women and their spouses in the family planning clinic, Phuwiang Hospital, Thailand. Sroikham (2001) used the participatory learning to improve their knowledge about hypertension and correct self-care behavior at KhumHuankeaw Hospital and Yasothon Hospital, Yasothon Province. Udompuech (2004) studied the effectiveness of participatory learning program on sex education for the father or mother of Mattoyomsuksa II students in Meung district, Lopburi province.

From the studies, the results show that participatory learning is a strategy that helps to develop knowledge, attitude, and practice based upon the learner-centered. Therefore, this concept would be one approach to solve pesticide problems in this study.