Effect of Integrated Safety Program on Safety Behaviors among Rice Farmers: A Quasi-Experimental Study

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Abstract: Unsafe working behaviors are considered the most important determinants of injuries among rice farmers. This quasi-experimental study examined the effect of an integrated safety program for enhancing safety behaviors among rice farmers. Two districts in a province in Northern Thailand were purposively selected and randomly assigned to be the experimental and control groups. Eighty-two farmers from two districts were purposively selected according to the criteria and matching equally for each group. The experimental group only received the integrated safety program which comprised awareness raising, working behavior modification, and a supportive environment. Safety behaviors were measured by a structured questionnaire. Data were analyzed using descriptive statistics and two-way repeated measures analysis of variance (ANOVA).

Results revealed that the participants in the experimental group had statistically significant higher mean scores of safety behaviors that included safe pesticide use, personal protective equipment use, and compliance with safety rules and regulations, than those in the control group across all time points of measurement at weeks 8 and 12 after during follow-up. Thus, this safety intervention could be useful for nurses and occupational health professionals, and health promoters to enhance safety behaviors among rice farmers and thus reduce farmer morbidity and mortality due to unsafe work practices.

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Introduction

Farming is a hazardous industry.[1] It is recognized as a dangerous occupation as a result of the high incidence of injuries reported in comparison to other occupations such as construction and mining.[2,3] Trends of injuries among rice farmers are increasing in both developed and developing countries.[4,5] In 2018, the National Statistical Office of Thailand reported that there are 12.56 million agricultural workers and more than half are rice farmers (58.80%).[6] The prevalence of injuries in agricultural workers is 24.54%, and more than half of the injuries occur among general farmers (53.59%), which includes

rice farmers.[7] The type of injury among rice farmers includes superficial injuries and open wounds from sharp objects (62.74%), injuries acquired following physical trauma, falls and motor vehicle or tractor accidents (18.49%), and acute poisoning from pesticide exposure (8.11%), respectively.[6] Such injuries among farmers produce both economic and health burdens resulting in disability and poor quality of working life.[5,8] Evidence suggests that the main causes of injuries among rice farmers are related to unsafe behaviors.[9-11] These behaviors include not using personal protective equipment (PPE) and not complying with safety rules and regulations while working with pesticides, machinery and sharp equipment.[10-12] This evidence underscores the need for an intervention aimed at preventing injuries among rice farmers, hence this was the focus of this study.

To develop an effective intervention for preventing injuries among farmers it is important to understand the causes of unsafe behaviors. The literature indicates that causes are related to lack of awareness,[10-11] and lack of training.[10,13] Raising awareness is key to successful behavioral change.[11-14] Nonetheless, previous studies only paid attention to knowledge, which may be unable to stimulate behavioral change effectively.[15] Most safety interventions among rice farmers, for instance, have focused solely on educational interventions, which are ineffective for changing long-term behavior.[16,17] Moreover, existing interventions reported in the literature had only short-term outcome evaluation.[15,18] Systematic reviews of safety interventions among rice farmers suggests that multi-factorial integrated approaches are the most promising means for promoting safety behaviors and preventing injuries.[15,18]

Promoting safety behaviors and reducing risks to workers health can be accomplished using the concept of Workplace Health Promotion (WHP).[19] This concept has three main components including awareness raising, behavioral modification, and creating a supportive environment.[19] Such concepts have generally focused on promoting worker's health and the decreasing of risk to health among workers through various activities.[19-20] To raise awareness, information is provided to the individual in a manner that catalyzes modification of behavior and enhances individual confidence in their ability to successfully change behaviors.[19] The literature provides evidence of the success of adopting the three main components of WHP,[20-21] but there is little data to show the effectiveness among rice farmers who are informal workers and therefore receive less attention from occupational health services than formal workers.[22-24] Thus, an intervention using the three components of WHP, raising awareness, adopting safety behaviors, and creating an environment for long lasting behavioral change, is paramount. Moreover, outcome evaluation measuring program effects on safety behaviors in the rice farmers was still questionable, and also existing program focus on short-term outcome evaluation.[15-16] Therefore, a quasi-experimental study was used in this study to examine the effect of safety behaviors among rice farmers.

Literature review and theoretical framework

Safety behavior refers to the characteristics of actions or performances of individuals under conditions without danger, risk of accident, injuries, disabilities, and death due to work, that affects the person, property and the environment.[25] A variety of occupational health hazards in the workplace have contributed to occupational health problems among workers. Considering the causation of occupational health problem, it was found that unsafe behaviors were a main cause of such problems.[19,20] Unsafe behavior refers to the performance of a task or other activity that is conducted in a manner that may threaten the health and safety of the workers, such as a lack of PPE use, using defective equipment, unnecessary haste in working, and lack of compliance with safety rules and regulations.[25] To prevent occupational health problems effectively, the safety

program needs to increase safety awareness, modify behavior, and create a supportive environment.[19]

Raising awareness refers to the process of increasing of recognition the occupational hazards in order to protect and prevent occupational health problem both short and long term health consequences.[19] Methods for raising awareness among workers include a variety of risk communication methods: group discussion, safety media including photographs, posters, audiovisual materials, and videos.[19,20] Evidence shows that raising awareness through group discussion and using video or multi-media were effective in increasing awareness and behavior change among farm workers.[21,25,26]

Behavioral modification refers to techniques such as altering behavior and reaction to stimuli through positive and negative reinforcement.[19] The techniques used to decrease or increase a particular behavior of the target population helps workers modify behaviors such as using PPE when exposed to certain occupational hazards and following safety rules and regulations while at work and while farming.[20,27] Common methods used to assist individuals change their behavior include reinforcement of safe behaviors, incentives, and social support.[20,24] A previous study employing a behavioral modification strategy that included group discussions, demonstrations and return demonstrations related to the use of PPE, showed significantly improved safety behavior among farmers.[24,28]

Creating a supportive environment refers to creating an environment within the workplace that enhances behavioral change.[19] These activities include posting safety and warning signs in the work area[19,20] that encourage safety behavior among workers.[29] A previous study suggested that posting safety rules and regulations and warning signs in the workplace facilitated wooden furniture workers to maintain safety behaviors.[21] Our study adopted the concept of WHP to be the theoretical framework.

Study aim: To examine the effect of an integrated safety program on safety behaviors among rice farmers.

The study hypothesis: The mean scores of safety behaviors in the experimental group would be significantly higher than those of the control group at eight and twelve weeks after completing the program.

Method

Design: A quasi-experimental with a two-group design.

Participants and Settings: Two districts with the highest proportion of rice farming in a northern province of Thailand were purposively selected and randomly assigned to be the sites for the experimental and control groups of farmers. The sample size of this study was estimated using a power-analysis with a significance level of .05, a power of .80, and effect size of .43 was estimated from a previous study.[27] The estimated sample size was 36 participants per group but an additional 20% participants were added to compensate for possible attrition. Therefore, 41 participants were included in each group to ensure a sufficient number. The participants were purposively selected according to the inclusion criteria of: aged 18 years and older, both male and female, engaged in rice-farming for at least one year, involved at least one rice growing process such as land preparation, planting, maintaining the planted seedlings and harvesting, being able to read and speak Thai, and willing to participate in the study. A matching method was used to control confounders, which included gender and age (±3 years), between two groups. There were 94 potential participants in both districts who met the inclusion criteria (45 from the experimental group district and 49 from the control group district). The result of matching yielded 41 participants for each group.

Research instruments

There were two instruments used in this study:

1. A demographic questionnaire. This was developed by the researchers, and collected data on gender, age, marital status, educational level, underlying disease, work experience, and safety training experience.

2. Structured Questionnaire of Safety Behaviors among Rice Farmers was modified from a structured questionnaire regarding working behavior from a previous study by Chanprasit et al. (2013).[30] It is comprised of items regarding the use of pesticides (15 items), personal protective equipment (PPE) (12 items), and compliance with safety rules and regulations (16 items). The total number items is 43 and examples of these are: read the label before using pesticides, use of expired pesticides, check the readiness of the personal protective equipment before use, wear gloves while mixing pesticides, and check sharp equipment before use. The rating of responses is done on a scale between 1-3 ('never done', 'sometimes done', and 'always done'). A higher score indicates a higher level of safety behaviors. The structured questionnaire was reviewed and validated by five experts: two occupational medicine instructors, two occupational health nursing instructors, and a toxicologist with expertise in pesticides. The content validity index was 1.00. The Cronbach's alpha coefficients in the pilot with 15 participants and actual study were 0.72 and 0.95, respectively.

The Integrated Safety Program (ISP)

The ISP was developed based on the concept of WHP: raise awareness, behavioral modification, and create a supportive environment, aiming to encourage safety behavior among rice farmers. There were five sessions, which focused on three safety practices including safe pesticide use, PPE use, and compliance with safety rules and regulations. The ISP was reviewed and validated by five experts: two occupational medicine instructors, two occupational health nursing instructors, and a toxicologist with expertise in pesticides.

Three weekly, two-hour lessons were provided to the participants in the experimental group. The program and activities of the ISP are described in **Table 1**.

Table 1 Program and activities of the Integrated Safety Program

Week/ session	Content and Activities
Week 1: Session 1: raising awareness (One hour)	*Raising awareness (60 minutes):* ■ Showing and sharing technique, all participants watch a video regarding occupational hazards and adverse health effects in the rice farming process to raise safety awareness (10 minutes), and then are divided into groups (8-9 persons per group). They discuss and reflect on their feelings about video (20 minutes), then groups present their summarization (25 minutes/five minutes/ group). The researcher summarizes the lessons learned (5 minutes).
Week 1: Session 2: Modify safety behavior (One hour for communication skill training to promote safety behaviors)	*Occupational health and safety information (20 minutes):* ■ This session is a step beyond raising safety awareness and assists the participants making decisions to changing working behaviors; safety pesticide use, PPE use, and compliance with safety rules and regulations. *Sharing the experiences of a role model (20 minutes):* ■ Sharing experiences then session also includes good safety practices regarding safety pesticide and PPE use, and compliance with safety rules and regulations to create the inspiration and motivation to change working behavior of participants.

Table 1 Program and activities of the Integrated Safety Program (Cont.)

Week/ session	Content and Activities
	■ Demonstration and return demonstration regarding safety pesticide and PPE use (20 minutes): ■ Provide PPE materials such as mask, gloves, boots, and glasses for all participants. Show them the techniques of demonstration and return demonstration of PPE use to create self-confidence of participants in undertaking safety behaviors. ■ Allow all participants to do return demonstration of PPE use both individual and group to make sure that they understand and perform activities correctly. Give rewards for participants who complete correctly and motivate those who cannot, until all have mastered the PPE use correctly.
Week 1: Session 3: Creating a supportive environment (One hour for skill training to maintain changing working behavior)	*Create a physical working environment that encourages and maintain safety behavior (30 minutes)* ■ Allow participants to discuss and share their idea about supporting and maintaining behavioral modification over time. ■ All participants receive information about a physical working environment improvement. Provide posters regarding warning signs regarding occupational hazards and adverse health effects of rice farming to all participants.
Week 3: Session 4: Booster session (One hour to encourage to maintain safety behavior)	*Group discussion (60 minutes)* ■ Arrange ice-breaking activities for five minutes to strengthen relationship among them and ensure their intention to perform boost and maintain changing working behavior for 15 minutes. Discussion with all participants who change or do not change working behaviors regarding three main safety practices related to safety pesticide use, PPE use, and compliance with safety rules and regulations, to make sure that they understand and do this correctly. Give appropriate rewards for participants who change such safety behavior and continue to motivate those not changing behaviours until they hopefully make a decision to change working behavior and practice farming safely. ■ Allow participants to discuss and share their ideas about the problems or obstacles that need improvement and lead to their working behavioral modification. Summarize what they feedback, and provide knowledge about how to modify safety practices and increase of the confidence of PPE use (30 minutes) ■ *Intention (10 minutes):* Give positive feedback to all participates during activities, and strengthen their intentions to continue to change their working behavior.

Ethical considerations

The Research Ethics Committee of the Faculty of Nursing, Chiang Mai University, approved this study (No. EXP-023-2016). The participants were informed about the study objectives and processes, confidentiality, risks, benefits, and their rights. They were able to ask questions and withdraw from the study as per their wish. Consent and agreement was obtained from the participants prior to data collection.

Data collection

The researchers coordinated with the leader of the community to contact the participants in order to explain to them the research objectives and processes, confidentiality, risks, benefits, and participants' rights. Participants who agreed to participate in this study were asked to sign consent forms. Then participants had one on one interviews with the research assistants to collect baseline data. The participants in the experimental group received the ISP, whereas those in the control group did not receive the ISP.

Data was collected by six research assistants (RAs) who were graduate students with the experience of interviewing, and who were trained in the use of the instrument. The RAs collected the baseline data from the 82 participants in both groups through one-on-one interviews using the structured questionnaire, and spending 10-15 minutes per person. In addition, outcome assessors were blinded to the participants' group assignment to reduce information bias in particular social desirability between RAs and the participants during data collection. At weeks 8 and 12 post-intervention, the outcomes of the safety behaviors of participants in both the experimental and control groups were measured again using the questionnaire in interviews with the same RAs who collected the baseline data.

Data analysis

The demographic data of both groups were analyzed using descriptive statistics. Chi-square was used to examine the differences in participants' gender, age, marital status, education, and occupation, between the experimental and control groups using the baseline data. It was also used to examine the differences in the participants's gender and age in within both groups before the intervention. The independent t-test was used to examine the differences in the gender and ages of participants between the two groups. The two-way repeated ANOVA was used to examine the difference in safety behaviors among participants between both groups using the baseline data and at weeks 8 and 12 post-intervention, and to analyze data related to the hypotheses of the study.

Results

Demographic characteristics of participants

The gender of participants was equal between the two groups and the age range in both groups was the same, ranging from 35 to 73 years. Both groups were also similar in terms of gender, age, educational level, working experience, and safety training attended in all demographic baseline data (see details in **Table 2**).

Comparison of safety behaviors between the experimental and control groups

At the baseline, safety behaviors in terms of pesticide use, PPE use, and compliance with safety rules and regulations were not statistically different between the experimental and control group (**Table 3**).

Result of hypothesis testing

The mean score for pesticide use, PPE use, and compliance with safety rules and regulations in the experimental group was increased from the baseline to weeks 8 and 12 after the program. The score distribution for three components of safety behaviors, which comprised of pesticide use, PPE use, and compliance with safety rules and regulations, increased significantly from the baseline to week 8, and only slightly increased from week 8 to 12. This result showed significant differences in pesticide use, PPE use, and compliance with safety rules and regulations scores in the experimental

Table 2 Demographic characteristics of both groups

Demographic data	Experimental n	Experimental (%)	Control n	Control (%)	χ^2	*p*-value
Gender					.500[a]	1.000
Male	17	(41.46)	17	(41.46)		
Female	24	(58.54)	24	(58.54)		
Age (years)					.106[c]	.512
30-39	1	(2.43)	1	(2.43)		
40-49	4	(9.76)	4	(9.76)		
50-59	19	(46.34)	19	(46.34)		
60-69	12	(29.26)	12	(29,26)		
70-79	5	(12.19)	5	(12.19)		
M±SD	53.84±11.18		53.16±10.89			
(Range)	35-73		37-72			
Education level					.112[b]	.204
Primary (Grades 1-6)	36	(87.81)	39	(95.13)		
Secondary (Grades 7-12)	5	(12.19)	2	(4.87)		
Working experience (years)					.028[b]	.234
< 20	15	(36.58)	7	(17.07)		
20-29	6	(14.63)	7	(17.07)		
30-39	8	(19.51)	5	(12.20)		
40-49	8	(19.51)	14	(34.16)		
> 50	4	(9.76)	8	(19.51)		
Working hours per week					.119[b]	.643
< 48 hours	38	(92.67)	37	(90.24)		
> 48 hours	3	(7.33)	4	(9.76)		
Safety training attended					.726[b]	.082
Yes	17	(41.47)	11	(26.83)		
No	24	(58.53)	30	(73.17)		

a = Chi-square, b= Fisher's exact, c= Independent t-test

Table 3 Comparisons of mean and standard deviation of safety behaviors at baseline between groups

Variable	Experimental *M (SD)*	Control *M (SD)*	T-test	*p-value*
Pesticide use	30.68 (0.87)	30.33 (1.23)	0.795	.830
PPE use	24.31 (3.87)	25.73 (3.68)	0.652	.742
Compliance with safety rules	28.70 (2.52)	28.92 (2.21)	0.847	.867

group between the three time periods of data collection. However, the results of Bonferroni test showed significant difference in pesticide and PPE use scores from weeks 8 to 12, whereas the results in the control group showed no significant difference in pesticide and PPE use score, except when comparing week 8 to 12 data, which showed a significant difference in compliance with safety rules and regulations score of the control group (**Table 4**).

Table 4 Comparisons of safety behaviors between each point of measurement within the groups

Group / safety behaviors	Mean (SD)			*p*-value		
	Baseline (1)	8th week (2)	12th week (3)	(1) vs (2)	(1) vs (3)	(2) vs (3)
Experimental group						
Pesticide use	30.68 (0.87)	34.75 (1.61)	35.12 (0.88)	.000**	.000**	.811
PPE use	24.31 (3.87)	30.21 (3.49)	31.70 (3.26)	.000**	.000**	.000**
Compliance safety rules	28.70 (2.52)	33.39 (2.03)	34.36 (1.77)	.000**	.000**	.000**
Control group						
Pesticide use	30.33 (1.23)	30.55 (1.24)	29.00 (6.64)	.125	.994	1.000
PPE use	25.73 (3.68)	25.70 (3.68)	25.68 (4.71)	.970	1.000	1.000
Compliance safety rules	28.92 (2.21)	28.73 (2.12)	29.21 (2.49)	.029	.132	.005*

Bonferroni test, ** = $p < .001$, * = $p < .01$

When comparing safety behaviors between each point of measurement between two groups, indications showed that there was a significant difference in such behaviors between the two groups at the baseline, and weeks 8 and 12 (p= .000). In the experimental group, the findings showed that the mean score of such behaviors was higher than those in the control group at the same time, and there was a steady increase from the baseline to that in weeks 8 and 12 in such behaviors after intervention. This finding indicates a significant difference between the scores of such behaviors between the two groups in the three time periods of data collection. While the findings in the control group showed that mean scores of PPE use and compliance with safety rules and regulations decreased from the baseline to 8th week after intervention, the mean score of pesticide use only slightly increased from the baseline to the 8th week. However, the result showed that there was a significant difference in the mean scores of such behaviors between the two groups. The results of changes in pesticide use, PPE use, and compliance with safety rules and regulations between the two groups at the baseline, and weeks 8 and 12 are shown in **Table 4**. When using two-way repeated measure ANOVA to compare changes in safety behaviors between each point of measurement between the experimental and control groups, a significant difference was found in the mean scores between the two groups. Also, there was a significant change of safety behaviors over time, $F(1, 41) = 4125.41$, $p < .000$. (**Table 5**).

Table 5 Multiple comparisons of mean difference of safety behaviors in each point of measurement between the groups

Variables	SS	df	MS	F^r	p-value
Within subject					
Group	552.445	1	552.445	122.14	.000**
Time x group	567.226	2	567.226	50.58	.001*
Error	361.829	82	4.52		
Between subject					
Group	82545.00	1	82545.00	4125.41	.000**
Error	361.82	41	5.83		

Note. ^{r} = Two-way repeated measure ANOVA. * = $p < .001$, ** = $p < .000$.

Discussion

The findings revealed that upon completion of the program, the experimental group had significantly higher safety behaviors in terms of pesticide use, PPE use, and compliance with safety rules and regulations than those of the control group at the 8th and 12th week after intervention. These significant results indicated the effective components of the intervention program, an interactive safety training. The first component of the program, awareness raising, encouraged the participants to realize the occupational health risks of farming and health benefits of PPE use as a result of a variety of risk communication, dissemination and information through interactive training. This supports findings in the literature regarding various techniques such as the showing of media regarding occupational health risks, group education, and group discussion, were effective methods[21,31] to increase awareness among participants, leading to the performance of safety practices related to pesticide and PPE use.[27] Further, using multimedia, for example, video that use animation and sound, effectively created an awareness and understanding of safety at work among the participants.[24]

Besides, the techniques of demonstration and return-demonstration of PPE use affected the self-confidence of the participants in undertaking safety behaviors, including safe use of pesticides and PPE use and compliance with safety rules and regulations, because the participants had a chance to learn about safety at work which contributed to their decisions to change their behavior. Moreover, creating a supportive environment through group discussion and learning with role models can increase motivation to learn about safety at work. In particular, the physical environment, posters and warning signs regarding risk to health and PPE use, stimulate participants to maintain safe working behavior.[22-23]

The result of this study supports past evidence[15,25] indicating that awareness raising is the most effective predictor of promoting safety behavior and risk reduction.[21] Our findings are also in accordance with the results of Santaweesuk et al.[27] that safety awareness influences the performance of safe behavior at work either in the safe use of pesticides or PPE use.[32] Further, creating a supportive environment by displaying posters of pesticide danger, PPE use, rules and regulation compliance could help maintain safety behaviors.[22,27] Another study also demonstrated that improving the physical environment by displaying warning signs regarding occupational health hazards and PPE use, and formulating effective safety rules and regulations at work, such as checking and maintenance equipment and machinery regularly, can support and maintain safety behaviors.[33]

The findings of this study indicate that an effective intervention program comprising awareness raising, safe behavior modification, and the creation of a supportive environment has the potential to initiate occupational hazard awareness leading to decision-making to change unsafe behavior thereby adopting and maintaining safety behaviors. The intervention program could be applicable for another setting in Thailand where the need for safe workplace behavior is a concern, but further testing of the intervention is required.

Limitations and Strengths of the Study

One limitation is that only two districts in a northern province of Thailand were purposively selected, thus generalization of the study might be limited as a result of individual differences in term of attitudes toward safety in farming work in other locations. In addition, the study did not adopt probability sampling for the recruitment of participants. This may raise questions about the representativeness of the study population. Also, this study used a quasi-experimental with a two-group design, thus the threat to internal validity may come from the history of the participants of the experimental and control groups. However, a strength of this study is that we used a matching method to control confounders, which included gender and age (±3 years), between two groups. Moreover,

data was collected by RAs who were trained in the use of structured questionnaire, and outcome assessors were blind to the participants' group assignment to reduce information bias in particular social desirability between RAs and the participants in both groups during data collection between each points of measurement.

Conclusion and Implications for Nursing Practice

The ISP in this study was found to be effective in increasing safety awareness and leading to changing behaviors among rice farmers in the 8th and 12th week after implementation. This program could be applicable to rice farmers in other settings. Occupational health nurses or health professionals should consider delivery of interactive safety training for rice farmers who are a disadvantaged group, and often are not accessible to formal occupational health services, in order to raise awareness and enhance their safety behavior. At the level of policy implication, standard safety interactive training should be established for all rice farmers.

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ผลของโปรแกรมบูรณาการความปลอดภัยต่อพฤติกรรมความปลอดภัยของชาวนา: การศึกษากึ่งทดลอง

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บทคัดย่อ: พฤติกรรมการทำงานที่ไม่ปลอดภัยเป็นปัจจัยเหตุสำคัญของการบาดเจ็บของชาวนา การศึกษากึ่งทดลองครั้งนี้มีวัตถุประสงค์เพื่อศึกษาผลของโปรแกรมบูรณาการความปลอดภัยต่อพฤติกรรมความปลอดภัยของชาวนา สองอำเภอของจังหวัดหนึ่งในภาคเหนือของประเทศไทยได้รับการคัดเลือกแบบเจาะจงและสุ่มให้เป็นกลุ่มทดลองและกลุ่มควบคุม กลุ่มตัวอย่างจำนวน 82 คนจากสองอำเภอได้รับการคัดเลือกแบบเจาะจงตามคุณสมบัติที่กำหนดและวิธีการจับคู่ในจำนวนเท่ากัน กลุ่มทดลองได้รับโปรแกรมบูรณาการความปลอดภัย ขณะที่กลุ่มควบคุมไม่ได้รับโปรแกรม โปรแกรมบูรณาการความปลอดภัยประกอบด้วย การสร้างความตระหนัก การปรับเปลี่ยนพฤติกรรมการทำงาน และการสนับสนุนด้านสิ่งแวดล้อม พฤติกรรมความปลอดภัยประเมินโดยใช้แบบสอบถามเชิงโครงสร้าง วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณาและการวิเคราะห์ความแปรปรวนแบบสองทาง

ผลการศึกษาพบว่า กลุ่มทดลองมีคะแนนเฉลี่ยพฤติกรรมความปลอดภัยทั้งการใช้สารเคมีกำจัดศัตรูพืชที่ปลอดภัย การใช้อุปกรณ์ป้องกันอันตรายส่วนบุคคล และการปฏิบัติตามกฎและระเบียบข้อบังคับความปลอดภัยสูงกว่าคะแนนเฉลี่ยของกลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติจากการติดตามผลในสัปดาห์ที่ 8 และสัปดาห์ที่ 12 ดังนั้นพยาบาลอาชีวอนามัยหรือบุคลากรด้านสุขภาพสามารถประยุกต์โปรแกรมนี้ในการเสริมสร้างพฤติกรรมความปลอดภัยของชาวนา

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คำสำคัญ: โปรแกรมบูรณาการความปลอดภัย พยาบาลอาชีวอนามัย ชาวนา พฤติกรรมความปลอดภัย การบาดเจ็บที่เกี่ยวเนื่องจากการทำงาน การสร้างเสริมสุขภาพในสถานประกอบการ

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