

Original Article

Effect of depression prevention programs among rice farmers in Thailand

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Abstract

Objectives: Depression is pervasive among farmers. In the present study, we tried to clarify the effects of programs aimed at preventing chemical intoxication or improving communication skills on ameliorating depression in rice farmers with mild-to-moderate depression symptoms. **Methods:** Ninety-two rice farmers (mean age, 49.0 years old) with mild-to-moderate depression symptoms, as measured by the Center for Epidemiologic Studies Depression Scale (CES-D), were randomly assigned to either a program for preventing chemical intoxication or one for improving communication skills in the family for 6 weeks. The participants were then crossed over to the alternate program for an additional 6-week period. Both programs consisted of a lecture and small group discussion on the starting day and a home visit by village health volunteers 4 weeks from the starting day. **Results:** After participation in the program, the CES-D scores showed a significant decrease in both groups. No interaction was obtained between the two programs. The decreased CES-D scores in the program for improving family communication skills were significantly related to the changes in the total scores of scales for attitude and practice on improving communication skills, even after adjusting for personal and communication factors. The decreased CES-D scores in the program for preventing chemical intoxication were significantly related to the change in the total score of scale for practice on preventing chemical intoxication. **Conclusion:** The findings in this study suggest that programs for prevention of chemical intoxication or for improving family communication skills may be effective at improving the depressive state of rice farmers with mild-to-moderate depression symptoms.

Keywords: communication, depression, multiple linear regression analysis, pesticide, rice farmer

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Introduction

Many farmers demonstrate poor mental health¹⁾. Farmers have an increased prevalence of depression compared to non-farmers²⁾. In Thailand, the prevalence of depression among farmers was higher (44.4% in 2014³⁾) than other countries (11.4% of male and 7.9% of female farmers in the northern part of Norway during 2006–2008⁴⁾; 15% in California, United States during 2006–2007⁵⁾). Because depression is a treatable condition, it is sug-

gested that preventive interventions should be targeted to this group to reduce the risks of developing depression^{6,7)}. However, information on suitable programs for the prevention of depression among farmers is limited⁸⁾.

In Thailand, the majority (more than 70%) of farmers are rice farmers⁹⁾. Recently we have clarified the possible effective actions to reduce the risk of depression among rice farmers in Thailand³⁾. These include support for health actions on working styles for males and an accepting atmosphere of family for females. We have emphasized the use of personal protective equipment (PPE) in the working styles. The proportion of using PPE is not high in Thailand. Thus, using PPE would be effective to reduce the depression associated with exposure to

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pesticides¹⁰⁻¹²⁾ or organophosphates^{12,13)}, since PPE can reduce the absorption of such chemicals. In an accepting atmosphere of family, “interest of family in talking with me” was the principal factor³⁾. Improving communication skills has been already established as one of the successful methods for mental health promotion¹⁴⁾.

Until now, interventions directed to the farmers have achieved limited success, and many of them do not address working style or accepting atmosphere of family^{8,15,16)}. In Thailand, where the prevalence of depression among rice farmers was higher, suitable programs for the prevention of depression among farmers are needed. The aims of this study were to confirm the effectiveness of programs aimed at improving family communication skills and at the prevention of chemical intoxication on depression in rice farmers with mild-to-moderate depression symptoms.

Subjects and Methods

Participants

Two sub-districts from two districts in Thailand where the rice farmers showed high prevalence of depression symptoms were selected based on our preliminary study³⁾.

A total of 568 recruited cases, whose age was at least 20 years, whose working duration was at least 5 years, and who were Thai, participated in a screening examination for depression symptoms using the Center for Epidemiologic Studies Depression Scale (CES-D) (measuring time E1). Cases of depression with CES-D score 30 or more were introduced to a primary care hospital for further examination. Thus, 203 subjects whose CES-D score was 16–29 were defined as having mild-to-moderate depression symptoms.

Participants in this study were also required to have sufficient level of education to understand study procedures and be able to communicate with researchers or site personnel. They were excluded if they had a history of psychiatric diseases, had ever taken any antidepressant medication, had symptoms or illnesses that limited activity, or had participated in any education program for the prevention of chemical intoxication or for improving communication skills during the prior 6 months. Consequently, 96 subjects agreed to participate in a trial of the program and signed a written informed consent.

Depression symptoms were re-evaluated and eventually confirmed just before starting the program (measuring time E2). After these strict assessments, 92 rice farmers were included as the participants.

This study was approved by Ethics Committee for Human Research of the Faculty of Public Health, Mahidol University (No.MUPH2014-149 and Protocol No.86/2557).

Study design

The study had a two-way cross-over design. Since it was ethically impossible to make a control group in this study, two programs were provided to participants sequentially.

The participants were randomly divided into two groups (group A, n=46; group B, n=46) and assigned to 13-week programs. In the first phase, group A started a 6-week program on prevention of chemical intoxication and group B started a program on improving communication skills in the family. Participants were then crossed over to the alternate programs for an additional 6-week period after a 1-week measurement period. Participants were not instructed to quit the behaviors acquired during the first program at the beginning of the second program (measuring time E4).

Programs

Program on prevention of chemical intoxication comprised a lecture (including demonstration of appropriate PPE use) and small group discussion (total 90 minutes) on prevention of chemical intoxication on the starting day (measuring time E2), and a home visit by village health volunteers, conducted 4 weeks from the starting day. In this study, thick plastic hand gloves, a chemical mask, goggles, long sleeve shirt/trousers, and tall boots were determined as PPE for preventing chemical intoxication. The lecturer was a director of the occupational medicine department of a tertiary hospital in a northeast prefecture of Thailand. Volunteers showed a good model, for example, of fitting a chemical mask or goggles, and they supported, advised, and encouraged practices.

The program on improving family communication skills comprised a lecture (including showing a good model of conversations with family members) and small group discussion (total 90 minutes) on communication skills on the starting day, and a home visit by village health volunteers, conducted 4 weeks from the starting day. The lecturer was a director of a mental health service center. The volunteers advised participants on topics of conversation with family members and offered encouragement.

The village health volunteers are appointed by the Public Health Office, Thai Government. They have been trained to promote health and prevent diseases of the local population, and are responsible for caring for some community health care. Because they are close to local people, participants readily show them real actions. In conducting this study, the volunteers who participated in the intervention programs were instructed to review the work with pesticides or organophosphates and communication in the family for one week before starting the first program and on the starting days of the first and second programs. They were also instructed to offer the advice on consistent and correct use of PPE during work

and the positive conversation with family members, such as admiring, questioning, and asserting, to check the frequency of behaviors using the checklist, to discuss problems and barriers in changing behaviors, and to encourage the continuing of practices. The methods were not standardized because they had already worked in their respective ways. The same person was responsible for administration of both programs for each individual participant.

Scales

1. Personal, working and communicating factors

Personal factors included 6 items: gender, age, marriage status, highest education, presence of disease, and family income.

Working factors included 4 items: frequency of using chemical substances, routes of exposures to chemical substances, using PPE, and chemical poisoning symptoms.

Communication in the family was evaluated for good or bad using the question item, "How do you think about your communication in family?" The respondents were allowed to select multiple answers from the examples. As good communication, four examples were provided: with satisfaction, joyfully, understandingly, and in kind terms. As bad communication, four examples were also provided: dissatisfied, joylessly, heartlessly, and in negative terms. In this study, the number of selected examples among good and bad communication styles were used as indices of the quality of communication.

2. Chemical intoxication

Literature on farmers' risks of chemical intoxication^{8,10,17} were reviewed.

Knowledge of chemical intoxication was measured using 17 items. Respondents had three choices: correct, wrong, or don't know.

Attitude against chemical intoxication was measured using 10 items. Answers were provided on a 3-point Likert scale: disagree, neither agree nor disagree, and agree.

Practice against chemical intoxication was measured using 16 items. Answers were provided on a 3-point Likert scale: never, sometimes, and always.

3. Communication skills in family

Literature on farmers' communication behaviors in the family¹⁸ were reviewed.

Knowledge of communication skills was measured using 15 items. Respondents had three choices: correct, wrong, or don't know.

Attitude for communication in family was measured using 15 items. Answers were provided on a 3-point Likert scale: disagree, neither agree nor disagree and agree.

Practice for communication in family was measured using 16 items. Answers were provided on a 3-point Likert scale: disagree, neither agree nor disagree and agree.

To validate the question items on working and communicating factors, chemical intoxication, and communi-

cation skills in the family, we asked five members of the Committee for Program Development and Evaluation, Mahidol University, to scrutinize them. We used all items, but corrected the verbal expressions of some question items according to their comments.

4. Depression symptoms

Depression symptoms were measured using the Thai version of CES-D. It is a brief, self-reporting questionnaire designed to measure the current state of depression in epidemiological research and has been widely used among the Thai population with good to satisfactory reliability and validity¹⁹.

The Thai version of CES-D is a 20-item tool through which respondents are asked to indicate how often they may have experienced symptoms of depression during the past week using a 4-point scale. Responses are summed to compute a total score ranging from 0–60, with higher scores representing higher levels of depressive symptoms. Two cut-off points for indicating depression, 16 points and 30 points, were used based on the original report¹⁹.

Statistical analyses

To confirm the gender difference in the effect of the programs, two-way repeated measures analysis of variance (ANOVA) was performed using the CES-D scores before and after the first program (measuring time E2 and E3). There was no gender difference in either program. Thus, a group combining both genders was created in this study.

Because of measuring the correct knowledge, items on knowledge were re-coded by allocating "1" for the answer, "correct," and "0" for the answers, "wrong" and "don't know." Items answered using 3-point Likert scales on attitude and practice were allocated 1 to 3 points. For validity of the question items which we had made to evaluate the effectiveness of the programs, a factor analysis was performed using varimax rotation with setting three factors (knowledge, attitude, and practice). The items with standardized factor loading values of 0.4 or more were selected.

Judging from the results using 43 items on chemical intoxication, the scale on practice was made using 16 items included in the first factor (Cronbach's alpha=0.928). The scale of attitude consisted of 10 items included in the second factor (Cronbach's alpha=0.854). The scale on knowledge comprised of 12 items included in the third factor (Cronbach's alpha=0.800).

Based on the results using 46 items on communication skills in family, the scale on practice was made using 16 items included in the first factor (Cronbach's alpha=0.869). The scale on knowledge consisted of 10 items included in the second factor (Cronbach's alpha=0.814). The scale of attitude comprised of 9 items included in the third factor (Cronbach's alpha=0.822). The selected items on chemical intoxication and com-

munication skills in the family are shown in the appendix table. The total scores were computed using the selected items of each scale.

Data are presented as mean and standard deviation or percent. To compare the data between the two groups, *t*-tests and Chi-square tests were used.

Two-way repeated measures ANOVA was used to analyze the difference in the total scores of CES-D between the two groups. One-way repeated measures ANOVA was used for analyzing the difference in the total scores of knowledge, attitude, and practice.

A multiple linear regression analysis (enter method) was used to examine the relationship between decreased CES-D scores and changes in total scores of scales for chemical intoxication and for communication skills in the family. Based on the research hypothesis, the two groups, the chemical intoxication intervention group ($n=92$) and the communication skills intervention group ($n=92$) were made. The independent variables were gender, sex, family income, exposure by spraying, the number of PPEs that the participants used, and the CES-D score before intervention in the chemical intoxication intervention group. For the communication skills intervention, independent variables were gender, age, family income, the number of selected examples among good communications, the number of selected examples among bad communications, and the CES-D score before intervention. The dependent variable was the CES-D score after intervention.

All statistical analyses were performed using SPSS ver. 18 for Windows (IBM Corporation, Armonk, NY, USA). The level of statistical significance in these analyses was set at $P<0.05$.

Results

Characteristics of participants

All 92 participated subjects completed the program. Thus, data analysis was performed using 92 participants. In the comparison of groups at baseline (measuring time E1), shown in Table 1, there were no significant differences between the intervention groups in gender, mean age, marriage status, highest education, and presence of disease. However, family income showed a significant difference between the groups.

As for factors related to chemical substances, frequency of using the chemical substances, routes of exposure to chemical substances, use of PPE, and chemical poisoning symptoms showed no significant difference. However, there was a significant difference between the groups in proportion who were exposed to chemicals via spraying.

For good communication in family, the proportion of those who selected three examples was highest in both groups. This factor showed no significant difference between the two groups. As for bad communication,

the proportion of those who selected three examples was highest in group A and the proportion of those who selected two examples was highest in group B. There were, however, no significant differences between the groups.

Volunteers visited the participants in the evening at least once a week and had the conversation to advise and encourage the use of PPE or communication in the family. The conversation time varied from 20 to 60 minutes.

Depression symptoms

Comparison of the groups just before starting (measuring time E2) revealed no significant difference in the CES-D score (Figure 1). The CES-D score decreased in both groups at the end of first program (measuring time E3). There was no interaction between the two groups ($F=0.08$). The CES-D score decreased in the both groups from just before starting the second program to the end of the second program (measuring time E4 to measuring time E5). There was also no interaction between the two groups ($F=1.87$). Even if we compared the difference in the change from measuring time E2 to measuring time E5, there was no interaction between two groups ($F=0.81$).

Figure 2a shows the time course of the total scales for chemical intoxication. The total scores of the three scales showed significant increasing tendency. The total scores of the three scores in group A (who received the chemical intoxication prevention intervention first) were significantly higher than those in group B at measuring time E3. However, there was no significant difference between the two groups at measuring time E5.

Figure 2b shows the time course of the total scores of scores of scales for communicating skills in the family. The total scores of the three scales showed significant increasing tendency. The total scores of the three scores in group B (who received the communication skills improvement intervention first) were significantly higher than those in group A at measuring time E3. Although the total score of knowledge in group B was still significantly higher, those of the attitude and practice showed no significant difference between the two groups at measuring time E5.

Factors related to change in the CES-D score

Table 2 shows the results of multiple linear regression analysis for the relationship between the changes in CES-D score and the changes in the total scores of chemical intoxication and family communication scales using the two combined groups. The change in the CES-D score in the chemical intoxication intervention group was significantly related to the change in the total scores of practice against chemical intoxication, even after adjustment for personal and working factors (Table 2a).

The change in the CES-D score in the communica-

Table 1. Personal, working and communicating factors of participants at the baseline (E1)

Demographic data	Group A (n=46)		Group B (n=46)	
	Number	Percent	Number	Percent
Gender				
Male	22	47.8	21	45.7
Female	24	52.2	25	54.3
Age, years, mean $\pm$ SD	48.5 $\pm$ 10.5		49.5 $\pm$ 12.3	
Marriage status				
Married	46	100	43	93.5
Widowed/divorced	0	0	3	6.5
Highest education				
No education	1	2.2	0	0
Primary school	21	45.7	26	56.5
High school	19	41.3	19	41.3
Higher	5	10.9	0	0
Presence of Disease	6	13.0	10	21.7
Family income**				
Enough & have saving money	2	4.3	3	6.5
Enough & no saving money	4	8.7	19	41.3
Not enough	40	87.0	24	52.2
Frequency of using chemical substances				
Rarely	17	37.0	18	39.1
Sometime	17	37.0	13	28.3
Often	12	26.1	15	32.6
Routes of exposure to chemical substances				
Mixing	10	21.7	6	13.0
Spraying*	20	43.5	9	19.6
Area using chemical substances	7	15.2	0	0
Use of Personal Protective Equipment (PPE)				
Thick plastic hand gloves	20	43.5	24	52.2
Chemical mask	22	47.8	26	56.5
Goggles	32	69.6	25	56.8
Long sleeve shirt	35	76.1	29	63.0
Long trousers	34	73.9	30	65.2
Tall boots	15	32.6	19	43.2
Chemical poisoning symptoms				
Never	23	50.0	25	54.3
Sometime	13	28.3	14	30.4
Always	10	21.7	7	15.2
Number of selected examples among good communications in family				
1	0	0	2	4.3
2	8	17.4	17	37.0
3	23	50.0	18	39.1
4	15	32.6	9	19.6
Number of selected examples among bad communications in family				
1	8	17.4	10	21.7
2	16	34.8	22	47.8
3	20	43.5	12	26.1
4	2	4.3	2	4.3

SD, standard deviation.

*p<0.05, **p<0.01

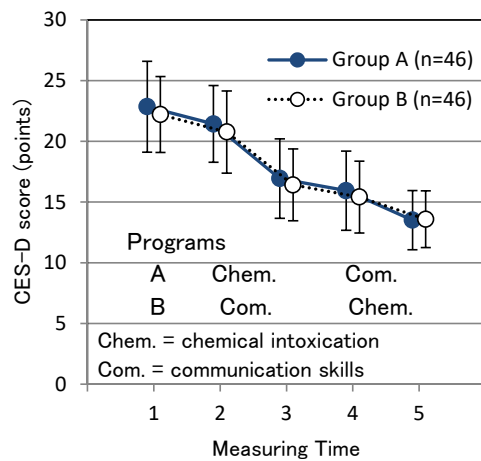
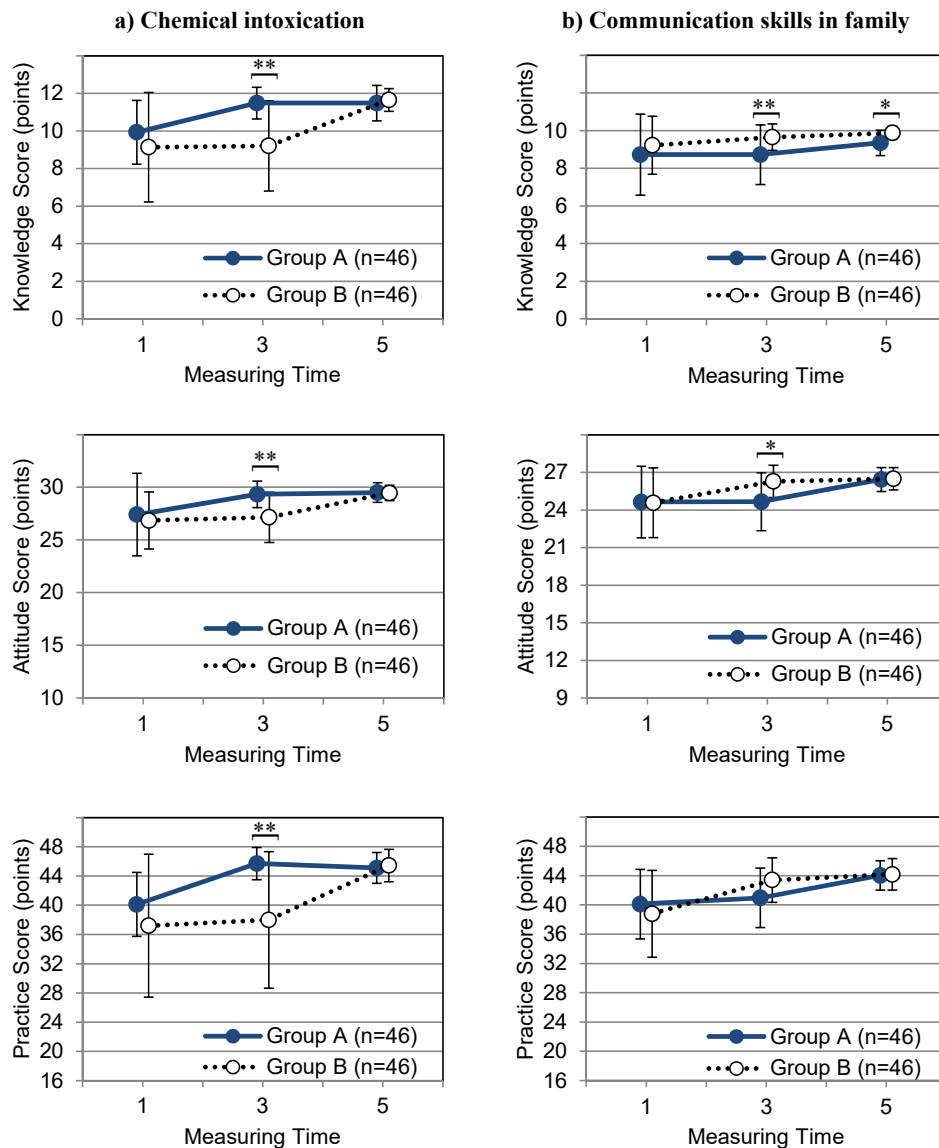


Fig. 1. Time courses of CES-D scores

tion skills intervention group was significantly related to the change in the total scores of attitude and practice for communication in the family, even after adjustment for personal and communication factors (Table 2b).

Discussion

The results have demonstrated that both interventions significantly reduce depression symptoms. Consequently, we confirmed the effectiveness of the communication skills intervention and clarified that of the chemical intoxication intervention on depression in rice farmers with mild-to-moderate depression symptoms. These findings may be beneficial in the primary care of rice farmers with mild-to-moderate depression symptoms.



* $p < 0.05$, ** $p < 0.01$

Fig. 2. Time course of total scores of knowledge, attitude, and practice

Table 2. Results of multiple linear regression analysis for the relationship between the decreased CES-D score and the changed total scores of scales using the two combined groups

a) Chemical intoxication intervention group

Variables	Beta	95% CI		t	P-value
		Lower	Upper		
Knowledge of chemical intoxication	-0.087	-0.771	0.172	-1.265	0.210
Attitude against chemical intoxication	-0.124	-1.052	0.029	-1.884	0.063
Practice against chemical intoxication	-0.191	-0.613	-0.070	-2.502	0.014

a constant = 4.704, $R^2 = 0.673$, Adjusted $R^2 = 0.637$

Independent variables: CES-D score before intervention, gender, age, family income, exposure by spraying, the number of using PPE

Dependent variable: CES-D score after intervention

b) Communication skills intervention group

Variables	Beta	95%CI		t	P-value
		Lower	Upper		
Knowledge of communication skills	-0.048	-0.851	0.366	-0.792	0.430
Attitude for communication in family	-0.192	-0.692	-0.147	-3.062	0.003
Practice for communication in family	-0.253	-0.484	-0.163	-3.999	<0.001

a constant = 2.323, $R^2 = 0.783$, Adjusted $R^2 = 0.759$

Independent variables: CES-D score before intervention, gender, age, family income, the number of good communication at baseline (E1), the number of bad communication at baseline (E1)

Dependent variable: CES-D score after intervention

Program

Because pesticides damage the human nervous system, the pesticide exposure is related to depression²⁰. Some reasons for the unsafe use of pesticides include farmers' erroneous beliefs about pesticide toxicity, lack of attention to safety precautions, and lack of or failure to appropriately use protective gear and appropriate clothing during pesticide handling^{12,21}. These factors were included in the program lecture.

Farmers suffer from a lack of knowledge on safe use of chemical substances, lack of appropriate training for PPE (e.g., gloves, masks, long-sleeves shirts, and boots)²². Training for using PPE was also included in the lecture.

Knowledge rarely translates into safe practice. A study of Brazilian agricultural community reported that only 20% of subjects used the PPE (gloves, masks, hat, impermeable clothes, boots) against pesticides, although 90% of them were aware of the harmfulness of pesticides²³. In this study, volunteers encouraged the practice.

Depression symptom varies based on a household composition, perceived social isolation stressors, and social supportive relationship in the local area^{24,25}. Communication skills are key to developing and keeping friendships and building a strong social support network²⁵. Farmers lack in both knowledge and skills of communication²⁶. The training for basic skills for communicating between family members, such as active

listening, admiration, good questioning, and assertiveness, were included in the program lecture. Because earlier research suggested a greater likelihood of positive outcomes for self-help²⁷, the participants were supported and encouraged by the volunteers.

After the first program (group A: chemical intoxication prevention, group B: communication skills improvement), the total scores of three scales assessing knowledge and behavior related to chemical intoxication were significantly higher in group A than those in group B. The total scores of three scales for communication skills were significantly higher in group B than those in group A. These results may support the effectiveness of each program directly.

CES-D

In this study, participants were limited to those whose CES-D scores were 16 to 29. Individuals with a score of 16 or higher must have had at least six of the 20 symptoms of CES-D persisted for most of the previous week, or most of the symptoms on the scale for a short period of time. It is clinically important to reduce these symptoms in such participants.

The results of this study showed that the CES-D scores were decreased in both groups after the program. The effectiveness of the program on improving communication skills is consistent with the earlier study. The cop-

ing course was effective among subclinically depressed adults²⁸⁾, and communication skills of general practitioners augment the effectiveness of depression treatment²⁹⁾. As for the psychosocial factors at work, the interventions using health education, stress management, and meditation were effective^{15,30,31)}.

Information on the effectiveness of programs for the prevention of chemical intoxication on depression symptoms is limited. Earlier educational intervention on farming safety focusing on introducing the use of PPE (no defined information) failed to show a significant relationship between the intervention and depression mood³⁰⁾. This is partially because education changes knowledge but hardly changes practice. Our intervention may have been effective due to including the support and encouragement of volunteers.

The trends of decreasing CES-D scores showed no significant difference between the two groups. This may be corresponding to the earlier study that used two intervention methods: a goal-setting and planning manual, and a brief telephone call²⁷⁾. The methods of their study were congruent with each program of our study. There is, however, the possibility that common intervention methods between the two groups, such as meeting and social gathering with other people, home-visit of volunteers, and emotional social support by volunteers, were effective, regardless of the specific contents or topics of the program.

In statistics, a regression to the mean occurs when an extreme measurement is selected in the first measurement. Since we had performed the survey twice before starting the study and excluded those whose measurements dropped into normal range at the second measurement, the decrease in CES-D scores is unlikely to be caused by this phenomenon.

The change in CES-D score in the communication skills intervention group was significantly related to the change in the total scores of attitude and practice. The participants in the program recognized the information on improving the communication skills, became confident that they could improve their communication in family, and then tried to change the behaviors for communication in the family. These changes in attitude and practice may be effective on decreasing the depressive symptoms.

The changes in CES-D score in the chemical intoxication intervention group were significantly related to the change in the total score of practice. After participating in the program, rice farmers recognized the information on reducing the risk of chemical poisoning and became confident that they could have good outcomes from the chemical intoxication prevention because the scores for knowledge and attitude were increased. However, they were not significant predictive factors. In order to decrease depression symptoms, it is necessary for rice farmers to change the behaviors because the actual expo-

sure to chemical substances should be decreased.

Possible limitations of the present study should be mentioned. First, there was no control group. We had judged that simply observing the participants with depression symptoms for 6 weeks without carrying out a program was ethically problematic. Depression among farmers was related to multifactorial risks for instance working alone¹⁾; having little off time; being dependent on factors like the climate³²⁾, which they cannot control; holding an off-farm job³³⁾; having more stress³³⁾; having experienced pesticide exposure⁸⁾; and having suffered a farming-related injury³³⁾. Such factors may also contribute the decreased CES-D scores. Second, at the beginning of the second program, it was not allowed to quit the behaviors that the participants had acquired during the first program. Thus, the intervention of the second program might have the effect including that of the first one. Third, in this study, not psychiatric interview, but the CES-D was used to select the subjects. The CES-D is a questionnaire widely used as a screening tool, especially in primary care, but represents symptoms during the past weeks and may include temporary symptoms. Self-reported questionnaires like the CES-D have limitations in evaluating conditions. However, we assessed depressive state of the subjects twice in order to carefully identify depression symptoms of the subjects. Fourth, there was a significant difference in family income between the two groups before starting the program. This difference seems to be related to the difference in exposure to chemical substances by spraying. To reduce this effect on the results, we had supplied all participants with masks (3M Thailand, 9043 for gas or chemical agents) during the 13-week program. Fifth, the results obtained in this study may not be transferable to other farmers with different social and cultural contexts, because the use of chemical substances depends on the products and the circumstances of agricultural pest pressures.

In conclusion, depression is common among farmers. In the present study, we designed a two-way cross-over study to clarify the effects of programs aimed at preventing chemical intoxication and improving communication skills on depression in rice farmers with mild-to-moderate depression symptoms, as measured using the CES-D. Both programs consisted of lecture and small group discussion on the starting day, and home visit of village health volunteers for 4 weeks from the starting day. After participation in the program, the CES-D score showed a significant decrease. No interaction was observed between the two programs. Programs for chemical intoxication prevention or improving family communication skills may, therefore, be effective in improving depressive state of rice farmers with mild-to-moderate depression symptoms and may be beneficial in primary care in such farmers.

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Conflict of interest

The authors declare no conflicts of interest.

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Appendix Table. Question items on chemical intoxication prevention (a) and communication in family (b) used in this study

a) Question items on chemical intoxication prevention	b) Question items on communication in family
Content	Content
Knowledge - Types of chemical substances - Type of chemical toxicity - Entry routes of chemical substances to the body - Spraying downwind makes entry of chemical substances easier - Eating during work causes entry of chemical substances - Signs and symptoms of chemical poisoning - Using PPE prevents enter of chemical substances to body - Requiring thick plastic hand gloves to prevent chemical intoxication - Separately washing clothes for using chemical substances with detergent - Washing hand - Checking the air leakage from the mask is a fitting test - Doing fitting test before using chemical substances	Knowledge - Frustrate happens by no talking to each other - Active listening is talk with opening ears, eyes, brain and mind - Active listening is catching up important points - Admiration for other is the way to be a optimistic person - Good relationship begins from appreciation of each other - Appreciation demonstrates a good view toward others - Understanding the implications by good question - Open-ended questions are for clearer extension - Closed-ended questions are for conclusion - Accepting different opinions is an assertiveness
Attitude - Following the chemical instruction to reduce the risk of chemical exposure - Wearing a long-sleeved shirt/ pants to protect the skin - Wearing thick plastic hand gloves to prevent entry of chemical substances from skin - Wearing a gas protective mask to protect the respiratory tract - Using PPE during all working process to reduce risk against chemical exposure - Using PPE to prevent poisoning symptoms - Using PPE to reduce entry of chemical substances to interfere neurotransmitters - Washing hands to reduce entry of chemical substances to interfere neurotransmitters - Doing fitting test to prevent entry of chemical substances into the body - Using correct PPE to reduce depression	Attitude - Listening actively to what the family said - Recognizing the feelings and needs of the family - Improving family relationships by appreciation - Appreciating others sincerely and consistently - Using good questions to understand in family better - Using open-ended questions to understand in family - Using open-ended questions for others to explain thinking - Using closed-ended questions for clarity or conclusion - Taking courage to let others recognize the idea or feeling
Practice - Reading chemical instruction - Following the chemical instruction - Checking the equipment for chemical substances - Wearing a gas mask during preparing substances - Wearing thick hand gloves during preparing substances - Wearing long sleeve shirt - Wearing long trousers - Wearing tall boots - Wearing a gas mask during spraying - Wearing thick plastic hand gloves during spraying - Wearing goggles - Doing fitting test of PPE - Washing hands - Taking a shower - Washing the clothes separately from ones used for chemical substances - No entering to the area where using chemical substances	Practice - Listening actively and showing understanding - Showing respect for the speaker - Concentrating on listening - Seeing the pros and expressing the recognition to him/her - Speaking good words in family - Admiring both word and manner - Seeing good self after appreciation in family - Feeling good and happy admiration in family - Using open-ended questions to understand in family better - Using closed-ended question to confirm answer - Waiting for others to say more before question-out - Using questions to understand in family better - Balancing closed and open-ended questions - Taking courage to ask for help if necessary - Daring to say problems to the family members - Listening and accepting the different opinions of others