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Development and Validation of the Knowledge, Self-efficacy, Outcome Expectation and Behavior on Pesticide Exposure Prevention for Rice Farmers

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Abstract

Background: Rice farmers face the risk of exposure to pesticide. Assessment of knowledge, self-efficacy, and outcome expectation to promote personal protective equipment (PPE) use is important. This study aimed to develop and validate a social cognitive theory-based scale that focuses on knowledge, self-efficacy, outcome expectation and behavior on pesticide exposure prevention for rice farmers.

Methods: We used the Standards for Educational and Psychological Testing Guide as a validation framework to assess validity evidence: content validity, structural validity, discriminative validity and internal consistency. Structural validity was examined using exploratory factor analysis. Internal consistency was examined using Cronbach's alpha values.

Results: The content validity index scores ranged from 0.88 to 0.94 for four constructs. Exploratory factor analysis of social cognitive theory-based scale identified four factors that corresponded well with the four domains in social cognitive theory; namely knowledge, self-efficacy, outcome expectation and behavior. The Cronbach's alpha for knowledge (0.88), self-efficacy (0.97), outcome expectation (0.87) and behavior (0.93) subscales were acceptable.

Conclusion: The social cognitive theory-based scale on knowledge, self-efficacy, outcome expectation and behaviors on pesticide exposure prevention showed acceptable psychometric properties with respect to responses from rice farmers. This scale may have usefulness for public health personnel to assess change in knowledge, self-efficacy, outcome expectation and behaviors over time in intervention research.

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Introduction

Rice farmers face the risk of exposure to chemical substances such as pesticide. One of the methods to prevent chemical hazard is personal protective equipment (PPE) use. However, the ratio of those who use PPE when dealing with chemical substances was not so high (male 33.7%, female 44%) [1] in Thailand. It is important to promote the PPE use among rice farmers.

There are some factors to promote the health behaviors. One of them is self-efficacy, which means personal capability to adopt the behavior [2]. The other one is outcome expectation, which has potential influence on the behavior change [3]. Knowledge is also important to change the behaviors. To promote the health education effectively or evaluate its effectiveness, it is often used to measure self-efficacy, outcome expectation and knowledge [4,5]. Some scales are already developed to measure the self-efficacy and outcome expectation [5]. However, the scales to measure these two factors related to the PPE use in farmers are still not established. The scales to measure the knowledge on chemical hazard and behavior to prevent it are also not established.

This study aimed to develop and evaluate the scales to measure the knowledge, self-efficacy, outcome expectation and behavior to prevent chemical hazard of pesticide among rice farmers.

Materials & Method

Making preliminary questionnaire

1. The literatures on chemical or pesticides prevention behaviors, farmers' working characteristics, risk of chemical hazards and social cognitive theory were reviewed to examine the contents and psychometric properties of existing measures to prevent chemical hazard. We developed the original questionnaire using 63 items consisting four scales; knowledge, self-efficacy, outcome expectations and behaviors to prevent chemical hazard of pesticide. Each scale was made to represent a unidimensional construct derived from Bandura [2].

2. The panel of five experts in the area of occupational health and scale development reviewed the original questionnaire sheet. The panel of five experts was asked to rate each item on how strong it was relevant to the underlying scale. Based on Waltz and Bausell [6] advise, a 4-point ordinal scale was used to avoid a neutral and ambivalent midpoint. They were: 1= not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = highly relevant. Then, content validity index (CVI) was computed as proportion of items of which rating score was either 3 or 4 among total items of each underlying scale. A minimum of CVI was recommended to be 0.80 as an acceptable standard [7]. When any experts rated 1 for a item, the item was excluded from the questionnaire. When any

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experts rated 2 for a item, its expression was revised to become more suitable for the main concept of the underlying scale or to understand easier.

3. A focus group was made with 10 rice farmers to verify the expression and content of each item of the original questionnaire sheet reviewed by the panel of five experts. The subjects were recruited from Thai rice farmer who seemed to have same characteristics as the subjects of preliminary examination.

4. After revised by a focus group discussion, the preliminary questionnaire sheet was reviewed by the panel of five experts again. Rating each item was performed using method same as rating at the first review.

Evaluating questionnaire items to make scales

1. Three-hundred-fifty-three Thai rice farmers were recruited to complete the questionnaire including demographic data and items possibly relevant to knowledge, self-efficacy, outcome expectation and behaviors to prevent chemical hazard of pesticide. The one of researchers explained the aims and methods of the research, protection of the personal information, that participation was voluntary, that there was no disadvantage in not participating and absolute confidentiality of the individual both in oral and written forms. The participants who agreed with our survey gave the informed consent.

2. This survey was approved by Ethical Committee for Human Research of the Faculty of Public Health, Mahidol University (No. MUPH 2014-149 and Protocol No. 86/2557).

3. The Standards for Educational and Psychological Testing Guide [8] was used in this study to assess the validity and reliability of the scales.

4. Good-Poor (G-P) analysis was used to evaluate discriminative power of items. The participants were divided into four groups using interquartile range: highest, higher, lower, and lowest groups. Average score in each item was compared between the highest group and lowest group. The items showing no significant difference between them was excluded.

5. Item-Total (I-T) analysis was used to evaluate the internal consistency. The correlation coefficient (Spearman Rank correlation test) between the item and total score without subjective item was calculated. The item of which correlation coefficient was less than 0.4 was excluded.

6. Factor analysis was used using maximum-likelihood and Promax rotation to evaluate structural validity of the four scales. The item of which standardized factor loading was 0.4 and more was selected.

   To evaluate the discriminative validity, the subjects were divided into two groups: those who used PPE and those who did not from the demographic data. The mean values of total scores of items on knowledge, self-efficacy, outcome expectation and behaviors to prevent the chemical hazards of pesticide were compared between the two groups.

7. The international consistency of the final version of items was evaluated using Cronbach's alpha coefficient.

8. The steps of developing questionnaire items is shown in Figure 1.

Results

Making preliminary questionnaire

1. Original questionnaire contained 63 items: knowledge 25 items, self-efficacy 10 items, outcome expectation 10 items and behaviors to prevent the chemical hazards of pesticide 18 items.

2. The CVI at the first review of the panel of five experts was shown in Table 1. The CVI of knowledge was smallest but exceeded an acceptable standard (0.80). Corresponding to the protocol, the researchers excluded 4 items of 25 ones on knowledge.

Constructs	CVI
Knowledge	0.88
Self-efficacy	0.90
Outcome expectation	0.94
Behavior	0.92

Table 1: Content Validity Index (CVI) of the knowledge, self-efficacy, outcome expectation and behavior on pesticide exposure prevention.

3. Following suggestions from the focus group, the researchers excluded four items on knowledge and modified some items to easier understand.

4. At the second review of the panel of five experts, the rating score showed that 5 items of knowledge were rated less than 3. Thus, the researchers excluded such items. Among the items on self-efficacy, outcome expectation and behaviors to prevent the chemical hazards of pesticide, all items were rated 3 or 4. All items were used for next analysis.

5. After these procedures, the preliminary questionnaire was consisted of following items in each scale.

1) Knowledge consisted of 12 items including: characteristics of chemical substances (1 item), entry route to the body (4 items), chemical toxicities (2 items), chemical intoxication prevention (2 items) and fitting test for PPE use (3 items). The answers had 2 choices; correct and wrong.

2) Self-efficacy contained 10 items, including the questions measuring farmers' perception of their own ability to find and to use appropriate personal protective equipment (PPE) for pesticide exposure prevention. The answer had Likert 3 scales: disagree, neither agree nor disagree and agree.

3) Outcome expectation consisted of 10 items, including the questions of expectation of good outcome for health if they do some good behaviors for pesticide exposure prevention. The answer had Likert 3 scales: disagree, neither agree nor disagree and agree.

4) Behavior to prevent chemical hazard of pesticide consisted of 16 items including: reading the chemical instruction (1 item), following the chemical instruction (1 item), checking the equipment for chemical substances (1 item), wearing thick plastic hand gloves, chemical mask, long sleeve shirt/trousers, long boots, goggles against chemical substances (8 items), doing the fitting test (1 item), washing hands (1 item), taking a shower (1 item), washing the clothes separately from ones used for chemical substances (1 item), no entry to the area where chemical substances were used (1 item), storage chemical substances (1 item) and checking the finger chemical blood stripe for cholinesterase level after continuing use chemicals for 7 days. The answers had 3 Likert scales; never, sometimes, and always.

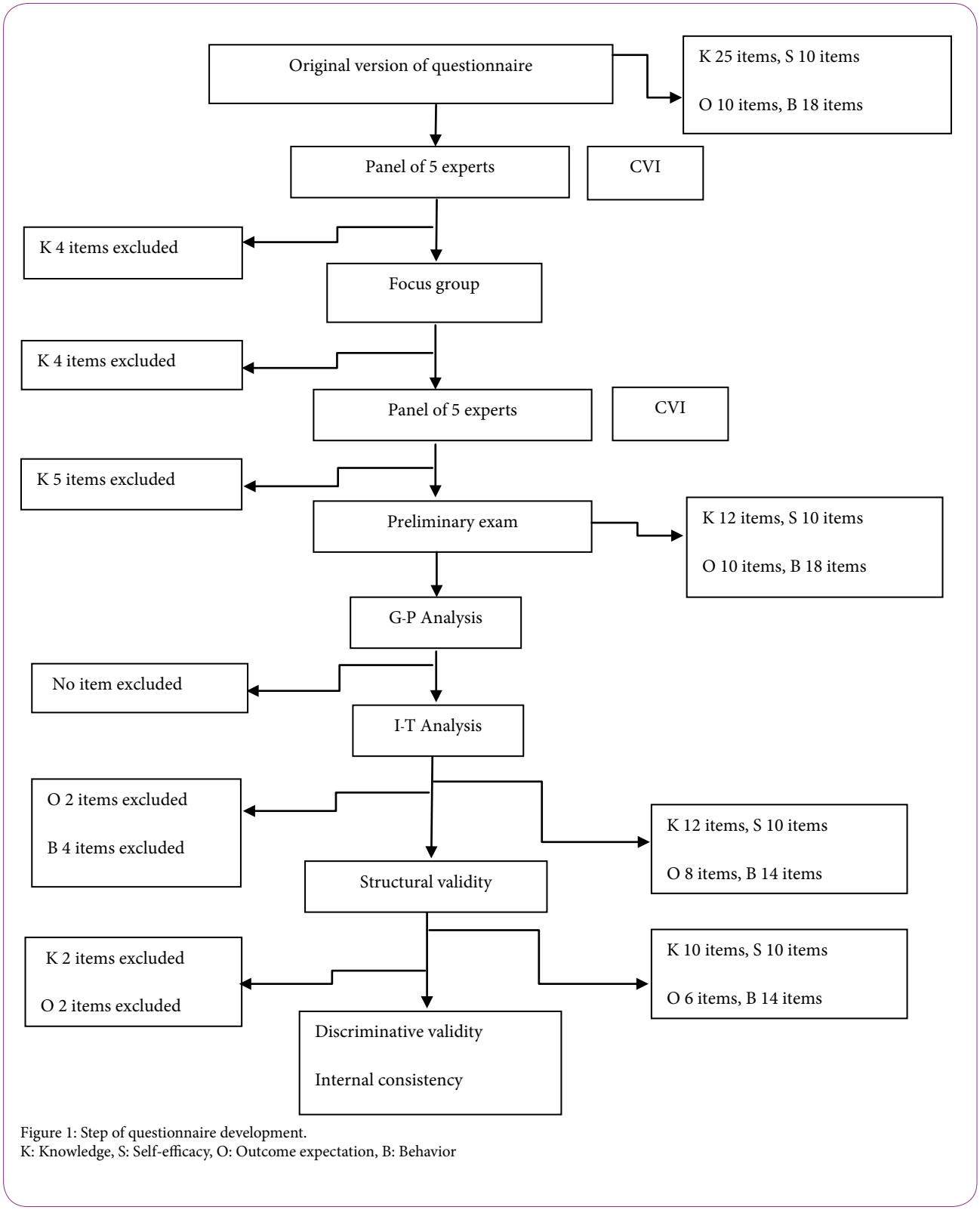

Figure 1: Step of questionnaire development.
K: Knowledge, S: Self-efficacy, O: Outcome expectation, B: Behavior

Table 2 shows the characteristics of participants. Two-third of participants are males (66.6%). More than a half of them were at forties and fifties (58.6%) and an average age was 46.0 (Standard deviation: SD 11.4). A half of them had educational level at primary school (46.7%). Most of them were married (89.8%). More than a half of them had not enough family income (67.4%). Most of them use PPE (89.5%) when dealing with chemical substances. They were exposed to chemical substances by mixing (28.3%), spraying (51.8%) and both mixing and spraying (19.9%).

Variables	Number	%
Gender		
Male	235	66.6
Female	118	33.4
Age (years)		
20 – 39	103	29.2
40 – 59	207	58.6
60 -78	43	12.2
Educational level		
No education	1	0.3
Primary school	165	46.7
Secondary school	144	40.8
High school and higher	43	12.2
Marital status		
Single	20	5.7
Married	317	89.8
Widowed/divorced	16	4.5
Family Income		
Not enough	238	67.4
Enough	115	32.6
PPE use when dealing with chemical substance		
No	37	10.5
Yes	316	89.5
Ways of chemical exposure		
Mixing only	100	28.3
Sprayings only	183	51.8
Mixing and Spraying	70	19.9

Table 2: Characteristics of the participants (n = 353).

Good-poor (G-P) analysis

There were significant differences in the average between in the highest group and lowest group in all items. Thus, all items; knowledge 12 items, self-efficacy 10 items, outcome expectation 10 items and behavior 18 items were remained. We used all items for the next analysis procedure.

Item-Total (I-T) analysis

Item-total analysis showed that the knowledge 12 items and self-efficacy 10 items had the correlation coefficient exceeding 0.40. However, 2 items of the outcome expectation and 4 items of the behavior had the correlation coefficient less than 0.40. These items were excluded. Therefore, the items of knowledge 12 items, self-efficacy 10 items, outcome expectation 8 items and behavior 14 items, 44 items, were used for the next analysis procedure.

Structural validity

Table 3 presents the results of factor analysis using 44 items. There were 4 components. The first component was comprised of 10 items (No. 13-22). They were the items on self-efficacy of which standardized factor loading value was 0.4 and more in the first component. The scale on self-efficacy was then made using 10 items included in the first component.

The second component was comprised of 14 items (No. 31-44). There were the items on behavior of which standardized factor loading was 0.4 and more. The scale on behavior was then made using 14 items included in the second component.

The third component was comprised of 12 items (No. 1-12). They were the items on knowledge. Because two items had the standardized factor loading value of less than 0.4, the two items were excluded. The scale on knowledge was made using 10 included in the third component.

The fourth component was comprised of 8 items (No. 23-30). There were the items on outcome expectation. Because two items had the standardized factor loading value of less than 0.4, the two items were excluded. The scale on outcome expectation was made using 6 items included in the fourth component.

In conclusion, all scales; knowledge, self-efficacy, outcome expectation and behavior to prevent chemical hazard of pesticide were 40 items.

Discriminative validity

Table 4 shows the mean scores of items on knowledge, self-efficacy, outcome expectation and behavior between those who used PPE and those who did not. The mean score of items on knowledge, self-efficacy and outcome expectation were higher in those who used PPE than in those who did not.

Internal consistency (Reliability)

Cronbach's Alpha of 10 items on knowledge was 0.882. That of 10 items on self-efficacy was 0.965. That of 6 items on outcome expectation was 0.868. That of 14 items on behavior to prevent the chemical hazard of pesticide was 0.927. The values exceeded the acceptable standard (>0.80) (Table 5).

Constructs	Non-PPE use (n = 37)		PPE use (n = 316)		P value
	Mean	SD	Mean	SD	
Knowledge	7.1	3.7	9.5	1.2	<0.001
Self-efficacy	16.1	6.2	28.3	3.9	<0.001
Outcome expectation	15.8	2.6	16.4	2.4	0.210
Behavior	30.3	9.2	38.1	4.6	<0.001

Table 4: Mean scores of items on knowledge, self-efficacy, outcome expectation and behavior of participants with those who used personal protective equipment (PPE) and those who did not (n = 353).

Constructs	**Number of Items**	**Cronbach's Alpha**
Knowledge	10	0.882
Self-efficacy	10	0.965
Outcome expectation	6	0.868
Behavior	14	0.927

Table 5: Cronbach's alpha of the knowledge, self-efficacy, outcome expectation and behavior on pesticide exposure prevention (n = 353).

Question	Component			
	1	2	3	4
1. Types of chemical toxicity include liquid, powder and tablet	0.112	0.183	0.667	0.111
2. Entry routes of chemical substances to the body via mouth, skin and respiratory	0.089	0.055	0.638	0.023
3. Spraying downwind makes entry of chemical substances easier	0.034	0.283	0.385	0.228
4. Acute toxicity symptoms cause fatigue, vertigo, hands tremor, seizure until unconsciousness	0.033	0.006	0.551	0.260
5. Requiring separately washing clothes for using chemical substances with detergent	0.104	0.065	0.559	0.041
6. Using PPE prevents enter of chemical substances to the body	0.144	0.132	0.666	0.095
7. Washing hands after chemical exposed to reduce entry of chemical substances to the body	0.091	0.100	0.604	0.132
8. Doing adjust strap is important for fitting test	0.160	0.307	0.542	0.127
9. Checking the air leakage from the mask is a fitting test	-0.033	0.154	0.352	0.574
10. Doing fitting test is required before using chemical substances	0.181	0.257	0.816	0.157
11. Requiring thick plastic hand gloves to prevent chemical intoxication	0.179	0.188	0.755	0.159
12. Requiring fitting test before using thick plastic hand gloves to prevent chemical intoxication	0.195	0.231	0.885	0.128
13. I can wear a long-sleeved shirt/ pants to protect the skin	0.919	0.245	0.198	-0.038
14. I can wear thick plastic hand gloves to prevent entry of chemical substances from skin	0.877	0.504	0.175	-0.020
15. I can wear a gas mask to protect the respiratory tract	0.887	0.391	0.178	-0.030
16. I can use PPE during all working process to reduce risk against chemical exposure	0.784	0.616	0.077	0.086
17. I can use PPE to prevent poisoning symptoms	0.741	0.547	0.041	0.069
18. I can use PPE to reduce entry of chemical substances to interfere neurotransmitters	0.881	0.255	0.197	-0.025
19. I can wash hands to reduce entry of chemical substances to interfere neurotransmitters	0.921	0.266	0.174	-0.030
20. I can do fitting test to prevent entry of chemical substances into the body	0.905	0.259	0.183	-0.056
21. I can use correct PPE reduce depression	0.888	0.365	0.125	-0.037
22. I can wear a long-sleeved shirt/ pants to protect the skin	0.866	0.361	0.104	-0.032
23. If I wear thick hand gloves during preparing substances, my skin will be protected from chemicals intoxication	0.025	0.276	0.118	0.395
24. If I correctly wear gas mask during work with chemical substances, I will be protected chemicals through respiratory tract	0.089	0.294	0.279	0.343
25.If I correctly use PPE during work every process with chemical substances, I will reduce risk from chemical intoxication	-0.005	0.131	0.191	0.835
26.If I doing fitting test before using chemical substances, I will reduce risk from chemical intoxication	-0.009	0.261	0.169	0.829
27.If I do protecting chemicals intoxication, I will reduce chemicals poisoning	0.110	0.364	0.163	0.432
28.If I correctly use PPE during work every process with chemical substances, I will reduce entry of chemical substances to interfere neurotransmitters	-0.014	0.104	0.113	0.855
29.If I wash hands, I can reduce entry of chemical substances to interfere neurotransmitters	-0.023	0.190	0.051	0.840
30.If I correctly use PPE during work every process with chemical substances, I will reduce mood disturbance	0.000	0.247	0.162	0.569
31. Following the chemical instruction	0.420	0.501	0.337	0.186
32. Wearing thick hand gloves during preparing substances	0.321	0.603	0.226	0.071
33. Checking the equipment for chemical substances	0.314	0.489	0.317	0.003
34. Wearing gas mask during preparing substances	0.346	0.734	0.249	0.117
35. Wearing long sleeve shirt	0.321	0.520	0.364	0.232
36. Wearing long trousers	0.310	0.484	0.331	0.023
37. Wearing long boots	0.341	0.674	0.270	0.053
38. Wearing gas mask during spraying	0.293	0.891	0.180	0.250
39. Wearing thick plastic hand gloves during spraying	0.294	0.824	0.186	0.160
40. Wearing goggles	0.250	0.676	0.063	0.495
41. Doing fitting test of PPE	0.380	0.862	0.198	0.138
42. Washing hands	0.421	0.618	0.406	0.110
43. Taking a shower	0.280	0.518	0.412	0.139
44. Washing the clothes separately from ones used for chemical substances	0.203	0.402	0.363	0.039

Table 3: Result of factor analysis of knowledge, self-efficacy, outcome expectation and behavior on pesticide exposure prevention (n = 353).
PPE: personal protective equipment.

Discussion

Our study describes the development of scales on the knowledge, self-efficacy, outcome expectation and behavior on pesticide exposure prevention for low income, rice farmers in Thailand.

The knowledge, self-efficacy, outcome expectation and behavior on pesticide exposure prevention questionnaire showed acceptable psychometric properties with respect to responses from the rice farmers. Based on our validity, reliability and acceptability analyses, we recommended using this scale to assess the effectiveness of the education program for developing knowledge, self-efficacy, outcome expectation and behavior based on social cognitive theory.

Four main constructs; knowledge, self-efficacy, outcome expectation and behavior showed good results. Content validity is an important source of validity evidence; it is essential to identify the concept being measured and is an early step in establishing construct validity. Based on this analysis, several revisions were made to the scale before it was formally assessed. The item-concept relevance of items adopted after reviewing the existing literatures was evaluated by the expert panel before and after group discussion with peer rice farmers. This process illustrates the importance of considering multiple evidence sources. A traditional approach to validity assessment would have resulted in the original items being assessed for relevance by an expert panel.

Knowledge is considered as a variable in the cognitive domain. The content validity, structural validity, discriminative validity and internal consistency showed the good properties for measuring the knowledge of chemical intoxication prevention. In this study, the participants in PPE use group had higher mean score of knowledge than those in non-PPE use group. This is in accord with the revised Bloom's Taxonomy [9].

As to self-efficacy, farmers had confident that they could improve behavior themselves for pesticide exposure prevention (use PPE, good sanitation behaviors; hand washing). The content validity, structural validity, discriminative validity and internal consistency, showed the good properties for measuring the self-efficacy on pesticide exposure prevention.

Outcome expectation measures the expectation of farmers about good outcome for health if they do good behaviors for pesticide exposure prevention. Content validity, structural validity, and internal consistency, showed the good properties for measuring the outcome expectation on pesticide exposure prevention. Since discriminative validity showed no statistical significance difference between PPE use group and non-PPE use group, discriminative power may be lesser than other domains. However, the mean score of PPE use group were still higher than non-PPE use group.

Mean score of behavior on pesticide exposure prevention significantly higher in PPE use group than those in non-PPE use group. Content validity, structural validity, discriminative validity, and internal consistency showed the good properties for measuring the behavior of pesticide exposure prevention.

This was the first administration of scales on the knowledge, self-efficacy, outcome expectation and behavior on pesticide exposure prevention. It has not yet been used in studies of research utilizing interventions. It is not known whether the scale is sensitive to and able to detect change in knowledge, self-efficacy, outcome expectation and behavior over time.

Our validity assessment revealed content overlap; several revisions were made to the scale before conducting a formal content validity assessment with experts. It was formally assessed for item-concept relevance with an expert panel. We found the item is a good match with social cognitive theory [10] and acceptable CVI more than 0.80. However, rice farmers in our study had difficulty understanding the item, because of low education. Therefore, more explanation should take into account when using this scales with the lower education group.

As to structural validity, we used exploratory factor analysis to intend clustering the items onto the most appropriate factor domain for assessing the internal structure of the scale but the purposefully non-redundant nature of items was found. Our scale had acceptable loading value (more than 0.4) and the items of each factor relevant to their four content domains based on social cognitive theory.

As to discriminative validity, the results showed the discriminative power of our scales, among participants who used the PPE and those who did not use. The results showed the mean score of knowledge, self-efficacy and behavior of the PPE use group were significantly higher than those of non-PPE use group.

As to internal consistency or reliability, our scales are good reliability index ranged 0.88-0.97. Since validity associated with fairness is the aim of assessment, we also recommend that estimates of reliability/precision be provided for each relevant subgroup for the assessment. Further, Cronbach`s alpha coefficients were generally acceptable supporting the internal consistency. However, estimates for the new knowledge, self-efficacy, outcome expectation and behavior scales indicated a need for further investigation.

Overall, the participants in this study might have been in the lower segment of the social competence level, and lower segment of the reported problem behaviors. This may indicate that the generality of our conclusions might be limited, and generalizations should be done with caution.

To sum up, current study provides a reliable questionnaire to assess the knowledge, self-efficacy and, outcome expectation, on pesticide exposure prevention that showed acceptable psychometric properties with respect to responses from rice farmers. This scale may have usefulness for public health personnel who work with aggregated group of people in community that have a risk to exposure to chemical hazards. Findings of the study provide new knowledge about psychological dimension related to agricultural practices.

Conclusions

The social cognitive theory-based scale on knowledge, self-efficacy, outcome expectation and behaviors on pesticide exposure prevention showed acceptable psychometric properties with respect to responses from rice farmers. This scale may have usefulness for public health personnel to assess change in knowledge, self-efficacy, outcome expectation and behaviors over time in intervention research.

Competing Interests

The author declear that they have no competing interest exists.

Author Contributions

All the authors substantially contributed to the study conception and design as well as the acquisition and interpretation of the data and drafting the manuscript.

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References

1. Hanklang S, Kaewboonchoo O, Morioka I, Suwan-ampai P (2016) Gender differences in depression symptoms among rice farmers in Thailand. Asia Pac J Public Health 28: 83-93.
2. Bandura A (1989) Social Cognitive Theory. In: Vasta R (ed) Annals of Child Development, Greenwich, CT: Jai Press LTD, pp. 1-60.
3. Bandura A (1991) Social cognitive theory of moral thought and action. In: Kurtines, WM & Gerwitz JL (eds) Handbook of Moral, Behavior and Development, Hillsdale, NJ: Erlbaum, pp. 45-103.
4. Blackman IR (2012) Factors influencing Australian Agricultural Workers' self-efficacy using chemicals in the workplace. Workplace Health Saf 11: 489-496.
5. Roy DD (2009) Self-efficacy of agricultural farmers: a case study. J Indian Acad Appl Psychol 35: 323-293.
6. Waltz CF, Bausell RB (1981) Nursing research: Design, statistics, and computer analysis, Philadelphia, F.A. Davis.
7. Carmines E, and Zeller R (1979) Reliability and Validity Assessment. Sage Publications, Beverly Hills, California.
8. American Psychological Association (1966) American Educational Research Association & National Council on Measurement in Education. Standards for educational and psychological tests and manuals, American Psychological Association, Washington DC.
9. Krathwohl D (2002) A revision of Bloom's Taxonomy: An overview. Theory into Practice 41: 212-264.
10. Bandura A (2004) Health promotion by social cognitive means. Health Educ Behav 31: 143-164.