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Effectiveness Of A Pharmacist-Initiated Education Program On Rational Drug Use Literacy Of Village Health Volunteers Registered At A Northern Subdistrict Health Promoting Hospital

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Abstract

Background: Adequate rational drug use (RDU) literacy of village health volunteers (VHVs) is essential for community health.

Objective: This study aimed to investigate the effectiveness of the pharmacist–initiated educational program on RDU literacy among VHVs.

Methods: This study was one-group pre-test-and-post-test study carried out between March – June 2021 at Sawang Arom Health Promotion Hospital, Dok Khamtai district, Phayao province, Thailand. The educational program was designed based on health literacy theory and comprised three sessions scheduled over a period of three weeks. The primary outcome was RDU literacy score, evaluated using the Rational Drug Use Literacy Scale. Descriptive statistics, paired t–test, and McNemar–Bowker test were conducted as appropriated. The eligible participants (n=60) were recruited into the study via purposive sampling.

Results: The results demonstrated that most of participants were female (n=54, 90.0%), approximately 70% (n=43) were over the age of 50, and 80% (n=48) had educational level equal to and lower than grade 9. The mean RDU literacy scores in pre-test and post-test were 18.85 ± 5.25 and 23.93 ± 2.15, respectively ($p<0.001$). Considering by aspect, it was found that the mean

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scores in compliance to the instructions on a medicine label ($p<0.001$), health advertising assessment ($p<0.001$), proper drug selection and utilization ($p<0.001$), and medical term comprehension ($p=0.006$) were statistical significantly higher than pre-test. Health information accessibility score was not significantly different from the baseline ($p=0.766$).
Conclusion: This pharmacist-developed educational program demonstrated effectively improved RDU literacy among VHVs. It may be advantageous to use this program in other areas.

Keywords: Rational Drug Use, Health Literacy, Village Health Volunteers, Thailand

INTRODUCTION

Irrational drug use is commonly observed in the health care system throughout the world [1]. The negative effects of irrational drug use on both the users and society are well-documented such as adverse drug reactions, unresponsive treatments, unnecessary health expenditures, prolonged hospitalizations, antimicrobial resistance, elevated mortality rate, all of which cause economic damage to the nation [2]. Appropriate use of drugs is also one essential element in achieving quality of health and medical care for the patients and the community [3,4].

Health literacy is the ability of an individual to access, understand and use health information for protection and maintenance of health [5]. In addition, since the level of health literacy that people have can be changed and improved, education and knowledge about health literacy are more important, and when it is developed, it will directly affect the health outcomes of people [6]. Several studies illustrated that irrational drug use behaviors among general population were related to people's health literacy [7,8]. People with inadequate health literacy may experience drug-related problems and engage in irrational drug use behaviors [9,10]. It could be stated that rational drug use (RDU) and health literacy are necessary for disease management [11,12]. For these reasons, both RDU and health literacy should be considered.

In Thailand, RDU has been raised as a national policy since 2011. The strategies for promoting RDU included: established the system and mechanism for RDU, training healthcare professionals, strengthening public people, solving, and preventing drug resistance, and controlling the unethical drugs promotion. [13] Even though the promotions of RDU have been continuous but has not been as successful as it should have been. Irrational drug use problems were found in hospitals and

communities including inappropriate indications, duration of therapy, doses of medication, and self-use of antibiotics [14,15].
Village health volunteers (VHVs) have been a regular partners of Thailand's health system since the 1960s. VHVs are recognized as community change agents due to their significant role in community health and facilitate people's participation in managing their own health [16]. Therefore, VHVs required the knowledge about medication and health products for use in their community activities to promote people's RDU behaviors and health literacy. Previous studies indicated that VHVs had greater health literacy than general population [17,18]. The results of Ngasangsai, et al. study showed that 12.5 % of VHVs had inadequate knowledge on antibiotics smart use [19]. The study of Yongpraderm, et al, expressed that VHVs had poor RDU literacy, considering by aspects, the advertisement assessment aspect was at poor level [20]. Hence, the establishment of adequate health literacy and RDU literacy in VHVs is necessary.

The concept of health literacy has been incorporated into health promotion among various Thai populations for example: patients [21], students [22], elderly [23] and VHVs [18]. Most studies focused exclusively on assessing health literacy levels or exploring the factors that influence health literacy. To the best of our knowledge, there is a paucity of studies on the development of educational programs or interventions for promoting health literacy in Thailand, especially RDU literacy. There was only one study found. A previous study was one group pre- and post- test study, conducted in VHVs resided at Donkaew sub-district, Mae Rim district, Chiang Mai province. The educational program was completed within a single day (six hours). The results demonstrated that RDU literacy score increased significantly [24].

Sawang Arom sub-district is one of twelve sub-districts of Dok Khamtai district, Phayao province, Thailand. It's located twenty kilometers from Maung Phaoyao district–a capital district of Phayao province. Sawang Arom sub-district is a semi-urban community and consists of eight villages with a total population of 4,500. This area is a pilot area in the health literacy promotion projects of Dok Khamtai hospital and Dok Khamtai District Public Health Office. The preliminary survey in Sawang Arom sub-district pointed out the risks of irrational drug use such as selling the dangerous or prescribing medicine in retail stores, contamination of steroids in herbal products, utilization of dietary supplements that are not suitable for underlying diseases. To enable the VHVs to inspect, monitor and communicate risks in the area, an educational program tailored to RDU literacy among VHVs should be developed. This present study aimed to measure the effectiveness of

the pharmacist–initiated educational program, recently developed by primary care pharmacists on RDU literacy among VHVs.

MATERIALS AND METHODS

Study Design and Setting

This study was a one–group pre-test and post-test study that aimed to measure the effectiveness of the pharmacist – initiated educational program on RDU literacy among VHVs. The study was carried out between March –to June 2021 at Sawang Arom Health Promotion Hospital, Dok Khamtai district, Phayao province, Thailand.

Participants and Sampling

The population of this study consisted of seventy-eight VHVs who registered under Sawang Arom Health Promotion Hospital. The inclusion criteria were (i) VHVs greater than 20 years old; (ii) proficient in Thai reading and writing skill and (iii) able to fill out questionaries on their own. Exclusion should be considered for participants who have not attended and successfully completed all three sessions in this program. The sample size was seventy-one. The calculation was performed using the G*Power program, setting test family to t-test, and statistical tests to mean: difference between two dependent means (match paired) mode. A type 1 error (α) was set of 0.05, power (1-β) of 0.8 and, effect size of 0.3. [24] Seventy-eight VHVs were invited to participate in this study at monthly meetings–March 2021. Sixty were willing to participate and then all were recruited into the study using purposive sampling. All participants stayed in study for two months. There was no loss from the study.

Outcomes and Measurement

The primary outcome in this study was RDU literacy score. The outcome was measured at the beginning (pre-test) of the study and six weeks afterward (post-test). Data collection tools were a demographic questionnaire and the Rational Drug Use Literacy Scale (RDULS).

A demographic questionnaire was developed based on the existing literature and included seven items on participants' age, gender, educational level, employment status, comorbid conditions, training topics, and experiences in health volunteer working. RDULS was a self–administered questionnaire. This scale was developed by RDU Community Working Group, Health Administration Division, Ministry of Public Health, Thailand.[25] It consisted of 5 parts (30 questions): (i) compliance to the instructions on a medicine label (6 questions); (ii) health advertising assessment (7 questions); (iii) proper drug selection and utilization (5 questions); (iv) medical term comprehension (10 questions); and (v) health information accessibility (2 questions). All

questions were multiple choice questions, except for those on health information accessibility being on Yes/No questions. The possible total score of the scale is 0-28; with 6 points for compliance to the instructions on a medicine label, 7 points for health advertising assessment, 5 points for proper drug selection and utilization, and 10 points medical term comprehension. This score is interpreted as follows: score 18 and more: high RDU literacy; score 15-17.99: moderate RDU literacy; and less than 15: poor RDU literacy. In the present study, the reliability test (pilot study) for this scale was carried out among 30 VHVs who lived in Muang Phayao district, Phayao province, Thailand, and the Cronbach's alpha coefficient from the pilot study was 0.76.

Intervention

The educational program has been developed to use as the experimental tool for this study. The program was decided based on health literacy theory.[26] Three experts assessed the educational program: one was a primary care pharmacist with ten years' experience and two were the instructors of the faculty of pharmacy who had expertise in RDU and health literacy, respectively. The contents of education were created similarly to the standard subjects and education determined by the Ministry of Public Health.[25] The program consisted of general information on RDU concepts such as RDU principle, antibiotic smart use, pharmaceutical and health products advertisement and promotions, medicine label reading, and the danger of polypharmacy. The learning activities were using slide and videos presentation, face-to-face interactions, and group-based education.

The educational program was made up of three times of activities and was delivered solely in Thai language. The participants were scheduled to receive the 1–2 hours educational program every two weeks as described below:

Week 1: Greeting and establishing relationships, explaining the study's objectives, memorizing group members, watching videos about RDU principle and antibiotic smart use, and summarizing the activity.

Week 3: Promoting compliance with the instructions on a medicine label and proper drug selection and utilization. The lecture was undertaken on reading medication labels, the dangers of polypharmacy and steroids use. Group-based activities such as case discussion and role-playing were used to promote interactive and critical literacies.

Week 5: Promoting health products advertising and health information assessment. In this session, video presentations regarding the advertising for drugs and health products were presented and then

there were discussions. Basic concept in drugs information search was presented in the lecture.

Data collection

The written permission was obtained from the director of Sawang Arom Health Promotion hospital, before starting the study. The researchers contacted the study hospital in advance to participate the VHVs' monthly meeting. The study objective, protocol, and participant's responsibility were discussed. Data collection was undertaken after participants signed a consent form. The pre-test was done on the day of recruitment. The post-test was administered the following week after the completion of the last educational module. The questionnaire was provided to the VHVs. Each person had 20 minutes to complete the questionnaire and handed it to the researchers. The participants were prohibited from seeking from external sources or using any equipment to find the answers.

Statistical analysis

Descriptive statistics were used to analyze both categorical and numerical variables. The demographic data (e.g.: gender, age group, educations, comorbidity, and training topics) or others categorical variables were presented as frequencies and percentages. Numerical variables (e.g.: RDU literacy scores) were presented as means, and standard deviations. The paired *t*–test analysis was performed for pre– and post– test comparisons respecting RDU literacy scores. The McNemar–Bowker test was analyzed for pre– and post– test comparisons respecting the proportion of participants with high RDU literacy level. The Exact McNemar test was used to compare the number of participants answering correctly between pre– and post– test. All analyses were performed using STATA SE version 14. Statistical significance was determined at a p-value less than 0.05.

Ethical consideration

This study protocol was approved by the Human Research Ethical Committee of Phayao Provincial Public Health Office (Approval No. 003/2566). The purposes and conditions of the study were described to the eligibles in the invitation phase. All participants signed informed consent prior to the process of data collection. The participants could withdraw from the study at any time without affecting. The participants filled out questionnaires with their own responses. Data analysis and presentations were kept confidential.

RESULTS

Characteristics of participants

Most of participants were female (n=54, 90.0%). Approximately 70% (n=43) were over the age of 50, and 80% (n=48) had educational level equal and lower than Matthayaom 3 or Grade 9. The mean experience in VHVs was 15.73 $\pm$ 8.56 years. During the timeframe of VHVs, the participants received training on variety of health topics such as: drug labeling reading (n=40; 66.7%); food contaminations (n=34, 56.7%); and advertising assessment (n=34, 56.7%), respectively. Demographic Characteristics of the participants showed in Table 1.

Table 1 Characteristics of the participants (n=60)

Characteristics	Number of Participants (%)
Gender	
Female	54 (90.0)
Male	
Age group	
31-40	2 (3.3)
41-50	15 (25.0)
51-60	27 (45.0)
> 60	16 (26.7)
Education	
Equal or lower than Matthayaom 3 (Grade 9)	48 (80.0)
Higher Matthayaom 3(Grade 9)	12 (20.0)
Occupation	
Farmers	39 (65.0)
Freelance / Self-employee	18 (30.0)
Unemployed / Retired	3 (5.0)
Comorbidity	
Hypertension	13 (21.7)
Diabetes Mellitus	7 (11.7)
Osteoarthritis, gout	7 (11.7)
Dyslipidemia	5 (8.3)
Training topic	
Drug labeling reading	40 (66.7)
Food contaminations	34 (56.7)
Advertising assessment	34 (56.7)
Food labeling reading	30 (56.7)
The dangers of steroids use	23 (38.3)
Antibiotic smart use	16 (26.7)
Nutrition information	8 (13.3)

RDU Literacy

The results of pre–test and post–test comparison showed the effectiveness of the study intervention in significantly increasing the mean scores of RDU literacy (18.85 $\pm$ 5.25 *vs.* 23.93 $\pm$ 2.15; $p < 0.001$). The mean RDU literacy scores for each section were shown in Table 2. After the implementation of the educational program, all aspects, except the health information accessibility, demonstrated statistically significant RDU literacy increases. All of participants (n=60, 100%) had a high level of RDU literacy after completing the intervention (Table 3). The number of participants with a high level of RDU literacy after the intervention was statistically significant compared to before the intervention (pre–test:41 (68.4%) *vs.* post–test: 60 (100%); $p < 0.001$).

Table 2 Comparing means of RDU literacy scores (n=60).

RDU literacy	*Full score*	Pre-test		Post-teat		ΔX	95% CI	*p*-value[a]
		X	*S.D.*	*X*	*S.D.*			
1. Compliance to the instructions on a medicine label	6	4.23	1.33	5.67	0.68	1.43	1.05, 1.82	<0.001
2. Health advertising assessment	7	3.22	1.70	4.62	1.19	1.40	0.86, 1.94	<0.001
3. Proper drug selection and utilization	5	3.45	0.87	4.50	0.68	1.05	0.77, 1.33	<0.001
4. Medical terms comprehension	10	7.95	2.77	9.15	0.97	1.20	0.53, 1.87	0.006
Overall	28	18.85	5.25	23.93	2.15	5.08	3.64, 6.53	<0.001

Note: X= mean; S.D. = standard deviation; ΔX = mean difference, CI= confidence interval; [a] paired t-test.

Table 3 Comparison respecting RDU literacy status (n=60).

RDU literacy level	Pre-test		Post-test		*p*-value
	No.	*%*	*No.*	*%*	
High	41	68.4	60	100.0	
Moderate	8	13.3			<0.001[a]
Low	11	18.3			

Note: [a] McNemar – Bowker test

DISCUSSION

This present study demonstrated the effectiveness of educational program on RDU. The results showed that the RDU literacy score of VHVs statistically significantly increased and all the VHVs participating in this study had a high level of RDU literacy. In the literature, the results of the current study were consistent to the results of previous studies that conducted a RDU educational program in VHVs [24] and diabetic patients [27], respectively. They showed that after the training, the mean score of RDU among participants increased significantly.

In this study, the RDU literacy was found to be high level at the beginning, and it was observed that the RDU literacy level increased significantly after the education. This increase, which is one of the primary results expected from the study, shows that the education given is effective in VHVs. This may be because during the educational session, the participants were allowed to express their opinions, take part in discussion, and ask questions, thereby enhancing their understanding. Participation may be a key success factor of this

educational program, as same as the other studies conducted in VHVs [24,28].
The mean RDU literacy scores for each section were significantly higher than they were at the beginning of the educational program. This was sensible since VHVs have responsibility for providing health education and advice to people in community. The results of this study were similar to the other studies among VHVs in Thailand [20,24].

In another hand, the health information accessibility score was not significantly different from the baseline. The study of Tachavijitjaru et al. [29] indicated that health information accessibility among VHVs was at a passable level. In accordance with Buachum's study, [30] the mean score for health information accessibility was the lowest compared to the other. Pansakun et al. [17] demonstrated that the accessibility to health information by VHVs was similar to the general population, while health information accessibility related to health behaviors and quality of life of the VHVs [31]. It may be speculated that the non-significant difference in this study could be attributable to the limited number of questions. However, the increased number of questions did not make a significant difference [19]. This emphasizes the importance that VHVs in this study and probably other provinces in Thailand really need to be trained more on health information accessibility literacy.

This educational program has a shorter completion time than previous studies [24,32], but it also has the potential to improve health literacy. The approach of the educational program that was investigated in this study has the potential to be utilized in the future as a form of training for VHVs who either have a high level of literacy or a limited amount of time to arrange activities.

LIMITATIONS

Several limitations were mentioned in this study. First, this study was conducted in one–group pre–and post– test design. The problem is that the difference between the outcomes might be due to factors other than intervention. Therefore, this current study attempted to arrange a short-course program to minimize distractions from outside. However, the true experimental study must be done to confirm the effectiveness of this educational program. Second, there was no randomized recruitment of the participants, the results of this study can only be applied to the participants. The generalizability may be limited. Lastly, the number of participants is lower than the calculated sample size. The studying of more participants over a long period of time can yield trustworthy results.

CONCLUSION

The educational program was able to effectively increase the mean score and level of RDU literacy in VHVs. Post-program average score on RDU literacy was higher than its pre-program score with statistical significance. Only health information accessibility score was not significantly different from the baseline. This approach can be used as a model for relevant authorities to develop the VHV's capabilities in accordance with the area's context.

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CONFLICT OF INTEREST

The authors declare they have no conflicts of interest.

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AUTHORS' CONTRIBUTION

The authors confirm contribution to the paper as follows: conceptualization–SL, RP, OM; methodology–SL, RP, OM; data collection: SL, RP; formal analysis–SL, OM; validation–OM; writing original draft–SL, OM; review and editing manuscript–SL, RP, OM; supervision–SL. All authors read and approved the final manuscript.

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