ORIGINAL ARTICLE

Effectiveness of the Behavioral Change Program for Controlling Analgesic Polypharmacy Use Behaviors with Non-Medical Indications among Population in Phichit Province, Thailand

Waraporn Kieongarm, PharmD[1], Archin Songthap, PhD[1], Yanisa Khambua, MD[2]

[1] Faculty of Public Health, Naresuan University, Phitsanulok, Thailand; [2] Bang Mun Nak Hospital, Phichit, Thailand

Background: Analgesic polypharmacy use with non-medical indications causes acute and chronic side effects. This problem results in adverse symptoms, and loss of resources, and finances that affects illness and death.

Objective: To evaluate the effectiveness of the behavioral change program for controlling analgesic polypharmacy use behaviors with non-medical indications among population in Phichit, Thailand

Materials and Methods: The present study was a quasi-experimental research, with two groups for pretest and posttest design. The present study samples involved 60 participants classified into two groups, with 30 for the experimental group and 30 for the control group. They were selected by purposive sampling technique. A self-administered questionnaire was used for data collection. The behavioral change program for controlling analgesic polypharmacy use behaviors with non-medical indications was employed in the experimental group for three months. Knowledge and analgesic polypharmacy use behaviors were assessed before and after the intervention. Data were analyzed using frequency, percentage, mean, standard deviation, chi-square test, independent sample t-test, and parried t-test.

Results: Most of the experimental group were female, at 73%, and 40% were aged between 41 to 59 years. In the control group, 67% were female, and 67% were aged 60 years and over. After the intervention, the experimental group had higher scores of knowledge about analgesic polypharmacy and behaviors for controlling analgesic polypharmacy use with non-medical indications significantly more than before the intervention and the control group ($p<0.05$).

Conclusion: The program was effective in controlling analgesic polypharmacy use behaviors with non-medical indications. Therefore, it can be utilized as a guideline to improve drug use behaviors in the targeted population.

Keywords: Analgesic polypharmacy; Behaviors; Social support; Non-medical indications; Thailand

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Improper use of medication has long been a major global problem. It was found that less than half of the patients who received standard treatment and more than half of the patients were unable to take the medication given to them by their prescriber. This problem results in adverse symptoms, and loss of resources, and finances that affects illness and death significantly. Annual losses are estimated at 4 billion to 5 billion U.S. dollars in the U.S. and 9.2 billion euros in Europe[1].

In Thailand, incorrect drug use occurs both in health care facilities and communities. This has been a national problem for a long time. A report on drug use in Thailand found that the cost of drug use in Thailand increased from 36,506 million Baht in 2015 to 98,375 million Baht in 2015 and up to 107,000 million Baht in 2019, with an average increase rate of 15% per year. It makes drug expenditures account for 46.7% of the health expenditures of the country. This cost is more than two times higher than that of developed countries, and there is a trend of importing drugs from abroad increasing from 46% in 2015 to 65% in 2019. Medicines entered the market together with the policies of the welfare state allowing people access to more treatment and opportunities to use medicines

Correspondence to:

Songthap A.
Faculty of Public Health, Naresuan University, 99 Village 9,
Thapho Subdistrict, Muang District, Phitsanulok 65000, Thailand.
Phone: +66-88-7534822
Email: archins@nu.ac.th

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and health products. When more drugs are used, problems become more common from drug use[2].

Unreasonable drug use of people affects the economy of the country and has a direct impact on the health of the people and the country, especially the overuse of medicine due to the attitude of people to medication. It leads to irrational use of medicine, causing negative effects on patients and society. It also causes a change in the health culture of people[3]. One of the inappropriate medications is the use of analgesic polypharmacy use behaviors with non-medical indications. The analgesic polypharmacy use is contaminated with steroids and non-medical indications, which has been a major problem in Thai society for more than 50 years. It causes an impact on health from the individual level to the national level[4]. The patients who take the polypharmacy are likely to have a likelihood of side effects such as overdosing, deteriorated drug, or non-standard treatment. This could be a cause of serious diseases and hypersensitivity to the drugs. In addition, drug users could be allergic because some medicinal components are contaminated with allergic medication. Polypharmacy is also known as a combination of medicines to be taken at the same time. Polypharmacy mostly contains dangerous drugs mixed that causes very serious impacts on health if used inappropriately, especially steroid contamination[5]. Synthetic steroids are substances that affect all the systems in the body, such as the risk of infection, stomach ulcers, problems in the central nervous system, rotten bone, osteoporosis, and other adverse reactions such as Cushing's Syndrome. Patients who take analgesic drugs contaminated with steroids must be hospitalized longer than general patients to recover. The patients affected by steroids increase the cost of treatment each year causing large damage to the national economy[6].

Improper use of medication, therefore, is considered an urgent problem that should be solved to raise the quality of medical care for people. Therefore, the Food and Drug Administration has issued a law to control the production, use, and distribution of medicines, and health products to promote safe drug use in the community[7]. Managing the problem of drug use in the community must be a collaboration between public health personnel community leaders and the public[8]. Inadequate health knowledge of people leads them to access various types of media related to drug use or inappropriate health products[9]. These problems cause a change in the health culture of people. Drug use safety of people cannot be changed immediately since both attitudes and beliefs of health cultures in seeking healing differ in each social context[10].

Social support is important for self-care and control of disease in chronically ill patients. Studies used social support combined with educating people with chronic illnesses to change health behaviors by supporting family members, relatives, village health volunteers, and healthcare providers[11]. Learning by group helps to support self-care of food, medication, and exercise to control the sugar level among diabetic patients. The results of the present study made the patients and relatives have better knowledge and better health behaviors to control the disease, resulting in better disease control than before the experiment[12]. From the literature review, it was found that receiving social support helps people change behaviors appropriately. The authors expected that social support could influence the behaviors of participants in controlling the analgesic polypharmacy use behaviors with non-medical indications in the present study.

The researchers were interested in implementing a program for controlling analgesic polypharmacy use behaviors with non-medical indications among the population in Phichit Province, Thailand using the concept of social support. Social support has been defined as efforts to aid individuals or that encourage their sense of attachment to specific groups. This theory helps to promote awareness of people to change to better health behaviors[13-16]. Social support in the present study involved health care providers and village health volunteers to give knowledge and skills about analgesic use to the study subjects for changing their behaviors. The results of the present study could be utilized as a guideline to prevent and control analgesic polypharmacy use behaviors with non-medical indications.

Objective

To evaluate the effectiveness of the behavioral change program for controlling analgesic polypharmacy use behaviors with non-medical indications among population in Phichit, Thailand

Specific objectives

1) To compare mean scores of knowledge of analgesic polypharmacy, and behavior for controlling analgesic polypharmacy use with non-medical indications between the experiment group and the control group after the intervention

2) To compare mean scores of knowledge of

analgesic polypharmacy, and behavior for controlling analgesic polypharmacy use with non-medical indications within the experiment group and the control group before and after the intervention

Hypothesis

1) After the intervention, mean scores of knowledge of analgesic polypharmacy, and behavior for controlling analgesic polypharmacy use with non-medical indications of the experiment group was significantly higher than the control group.

2) After the intervention, mean scores of knowledge of analgesic polypharmacy, and behavior for controlling analgesic polypharmacy use with non-medical indications of the experiment group was significantly higher than before the intervention and higher than the control group.

Materials and Methods

Study design, setting, and participants

A quasi-experimental research with two groups in a pretest and posttest design was conducted. The study population was the population in Phichit. The study sample was composed of 60 participants, and they were classified into two groups with 30 participants in each group. The sample size was calculated using the formula for testing the independent mean. The power was set at 80% with the alpha (α) of 0.05. The ratio of the experimental group to the control group was 1 to 1. The sample calculation for testing hypotheses about averages in experimental research. The sample type was based on two groups[17]

$$n = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 [\sigma_1^2 + \sigma_2^2/r]}{(\mu_1 - \mu_2)^2}$$

where, μ_1=50.24[17], μ_2=44.76[17], σ_1=8.02[17], σ_2=7.01[17], z=0.84[17], α=1.96 significant at 0.05, 1–β=0.80[17], and r=1

Therefore, the total number in the present study was 60 participants with 30 for the experimental group and the other 30 for the control group.

The study subjects were randomly selected from two sub-districts in Phichit Province by simple random sampling. One sub-district was the experimental group, and the other was the control group. The participants from each sub-district were selected by purposive random sampling. The inclusion criteria were 1) being age 25 years and over, 2) living in the area for six months or more, 3) being able to read and write Thai, and 4) being willing to participate in the present study. The exclusion criteria were 1) moving to live in another area, 2) having a sudden illness, and 3) being unable to complete the program.

Research tools

The authors employed two study tools including a self-administered questionnaire and a program for controlling analgesic polypharmacy use behaviors with non-medical indications. The questionnaire was constructed based on theoretical concepts and related studies including three parts, 1) sociodemographic characteristics, 2) knowledge about analgesic polypharmacy, and 3) analgesic polypharmacy use behaviors. The sociodemographic characteristics included six items regarding data on study subjects. The knowledge was assessed through ten yes or no questions. The analgesic polypharmacy use behaviors composed of ten 5-level rating scale questions starting from always to never. Analgesic polypharmacy use behaviors refer to drugs that can be used to eliminate any pains. Analgesic polypharmacy includes multi-form or multi-colored tablet that is arranged in a set of two or more types and sold with the intention that the user of the pain relief kit can take it to treat, cure, and relieve symptoms of pain, soreness, and fatigue from work or exercise. In the present study, the analgesic polypharmacy can include steroid and non-steroidal drugs. Definition of analgesic polypharmacy and analgesic polypharmacy behaviors were addressed in the direction of the questionnaire for participants to read before completing the questionnaire.

All questions with an item objective congruence (IOC) index greater than 0.5 were considered to meet the standard criteria of the validity test. The reliability of the questionnaire was examined among 30 participants not involved in the present study. The reliability test employed Cronbach's alpha coefficients for behaviors and knowledge was evaluated by the Kuder-Richardson 20 (KR-20). The reliability scores of knowledge and analgesic polypharmacy use behaviors with non-medical indications were 0.81 and 0.778, respectively.

A behavioral change program for controlling analgesic polypharmacy use behaviors with non-medical indications among the population in Phichit Province, composed of six activities: 1) educating knowledge, 2) enhancing practical skills on analgesic use, 3) home visits by village health volunteers, 4) supporting information by village health volunteers, 5) creating awareness, and 6) providing the service from healthcare providers. The activities of the program are shown in Table 1. The program

Table 1. Activities of the program for controlling analgesic polypharmacy use behaviors with non-medical indications

Activities	Sub-activities	Week/Time	Operator
1. Educating knowledge:	1) Analgesic polypharmacy use and behaviors	Week 1/1 hour	Researcher
	2) Side effects of analgesic polypharmacy use	Week 1/1 hour	
	3) Prevention of analgesic polypharmacy use	Week 1/1 hour	
2. Enhancing practical skills on analgesic use	1) Demonstrating and practising how to read drug labels	Week 2/1 hour	researcher
	2) planning about how to seek healthcare services when sick	Week 2/1 hour	
	3) Self-reporting of health problem and planning for seeking care	Week 2/1 hour	
3. Home visiting	1) Asking about illness and drug use of participants	Week 3/2 hours	Village health volunteers
	2) Observing drug use		
4. Supporting information	1) Assessing on drug use behaviors	Week 4/2 hours	Village health volunteers
	2) Suggesting about healthcare and drug use		
5. Creating awareness	1) Demonstrating about seeking plan for sickness	Week 5/1 hours	Healthcare providers
	2) Presenting role models who never consume analgesic polypharmacy use	Week 5/1 hours	Village health volunteers
	3) Motivating to perceive side effect of analgesic polypharmacy use	Week 5/1 hours	Healthcare providers
6. Providing the services	1) Explaining about services at the health centers for analgesic polypharmacy use	Week 6/1 hour	Healthcare providers
	2) Giving service to participants	Week 6-8/6 hours	

Thirty participants involved in every activity.

was verified by three experts in health behaviors, medical personnel, and community health. Five village health volunteers and three healthcare providers participated in the program. Village health volunteers were trained by the researchers before the home visit began. The control group received only routine suggestions about analgesic polypharmacy use when visiting the health center or hospitals to receive healthcare service.

Data collection

The program was used for the experimental group and lasted 12 weeks. Data was collected using a questionnaire. Before starting the experiment, both the experimental group and the control group were requested to answer the questionnaire as pretest. In weeks 1 to 2, the authors instructed on knowledge and enhanced analgesic use for the experimental group. Weeks 3 to 4 were home visits and supporting information to create awareness. In week 5 to 8, the authors organized the services by healthcare providers to support information about analgesic use and practice. In week 12, the program was completed, and data was collected from a posttest in both the experimental and control groups using the same questionnaire as the pretest. Then, the questionnaires were rechecked, and the complete questionnaires were used for data analyses. All data collection was performed by the researchers before and after the intervention separately at each health center. The authors met the researchers at the health center where the experimental group and the control group were located.

Statistical analysis

The sociodemographic characteristics of the participants were presented by frequency, percentage, mean, and standard deviation. Knowledge and analgesic polypharmacy use behaviors were reported by mean and standard deviation. To compare the means of knowledge and behaviors within the group, the paired t-test was used. To compare the means between groups, an independent sample t-test was employed. Chi-square test was employed to compare the difference of sociodemographic characteristics between groups. All significant levels were considered at 0.05. Data analysis was used Jamovi, version 2.6.17 (https://www.jamovi.org).

Ethical approval

The present study was approved by the Naresuan University Institutional Review Board with certificate of approval number, No. 0603.01.13(1)/NU-IRB 2431. Informed consent was obtained from all subjects and from the legal guardian(s) of illiterate participants. All methods were undertaken in accordance with the relevant guidelines and regulations.

Results

Sociodemographic characteristics of participants

Most of the experimental group were female, at 73.33%, 40% were aged between 41 and 59 years, and 66.66% were married. Of those, 43.33% graduated high school/equivalent level, 40% were employees, and 54.3% had average monthly income between 5,001 and 10,000 Thai Baht (Table 2).

Table 2. Sociodemographic characteristics of participants (n=60; the experimental group=30), the control group=30)

Variables	Experimental group (n=30); n (%)	Control group (n=30); n (%)
Sex		
Male	8 (26.67)	10 (33.33)
Female	22 (73.33)	20 (66.67)
Age (year)		
25 to 40	10 (33.33)	9 (30.00)
41 to 59	12 (40.00)	10 (33.33)
≥60	8 (26.67)	11 (66.67)
Marital status		
Single	5 (16.67)	7 (23.33)
Married	20 (66.67)	18 (60.00)
Widow/separated	5 (16.67)	5 (16.67)
Education level		
Primary school	3 (10.00)	5 (16.67)
Junior high school	4 (13.34)	7 (23.33)
High school/equivalent	13 (43.33)	12 (40.00)
Diploma/equivalent	10 (33.33)	6 (20.00)
Occupation		
Housework	4 (13.33)	2 (6.67)
Employee	12 (40.00)	14 (46.67)
Agriculturalist	14 (46.67)	14 (46.67)
Average monthly income (Thai Baht)		
≤5,000	10 (33.33)	8 (26.67)
5,001 to 10,000	12 (40.00)	10 (33.33)
>10,000	8 (26.67)	12 (40.00)

In the control group, 66.67% were female, 66.67% were aged 60 years and over, and 60% were married. Most of the control group (40%) completed high school/equivalent level, 40.67% were employees, and 40% had an average monthly income of more than 10,000 Thai Baht (Table 2).

When comparing the sociodemographic characteristics between the intervention group and the control group, there was not significantly difference (p>0.05).

Comparison of knowledge about analgesic polypharmacy, and behaviors for controlling analgesic polypharmacy use with non-medical indications between the experiment group and the control group after intervention

After the intervention, the experimental group had significantly higher mean scores of knowledge of analgesic polypharmacy, and behaviors for controlling analgesic polypharmacy use with non-medical indications than the control group (p<0.05) (Table 3).

Table 3. Comparison of knowledge of analgesic polypharmacy, and behavior for controlling analgesic polypharmacy use with non-medical indications within and between the experiment group and the control group after intervention (independent sample t-test) (n=60; the experimental group=30, the control group=30)

Variable	Mean	SD	p-value
Within group			
Knowledge about analgesic polypharmacy			
• Experimental group			<0.001*
Before	15.65	2.38	
After	13.06	2.05	
• Control group			
Before	12.44	2.59	0.690*
After	13.09	2.36	
Behaviors for controlling analgesic polypharmacy use behaviors with non-medical indications			
• Experimental group			
Before	17.06	2.04	<0.001*
After	13.08	2.28	
• Control group			
Before	12.52	2.59	0.693*
After	12.99	2.36	
Between group after the intervention			
Knowledge about analgesic polypharmacy			
• Experimental group	12.65	3.38	<0.001**
• Control group	10.80	0.868	
Behaviors for controlling analgesic polypharmacy use behaviors with non-medical indications			
• Experimental group	44.87	1.197	<0.001**
• Control group	29.03	2.560	

SD=standard deviation

* Paired t-test, ** Independent sample t-test

Before the intervention, the mean scores of knowledge of analgesic polypharmacy, and behaviors for controlling analgesic polypharmacy use with non-medical indications between the experimental group and the control group were not different (p>0.05) (data not shown). After the intervention, the experimental group had higher mean scores of knowledge and behaviors than before the intervention, whereas, there was no difference in the control group (Table 3).

Discussion

The present study indicated that after the intervention, the experimental group had significantly higher mean scores of knowledge of analgesic polypharmacy and behaviors for controlling analgesic polypharmacy use behaviors with non-medical indications than before the intervention and more than the control group.

The findings were consistent with the previous

study that found that knowledge about analgesic drugs was higher after the intervention and higher than the control group. Further, the previous study also reported that knowledge was positively related to analgesic drug use. It might be due to the program in the present study providing knowledge about drug use for the experimental group as they received it from village health volunteers and healthcare providers when they received home visits. Therefore, participants in the experimental group gained more knowledge about drug use than the control group. As a result, participants who had good knowledge about drugs were more likely to have more abilities to select and consider drug use safety as they took care of themselves. Moreover, they could select the medicine that is not harmful with low side effect[18,19]. The main purpose of participants in seeking analgesic polypharmacy was to cure diseases or health conditions by themselves[20,21].

The present study revealed that after the intervention, the experimental group had higher mean scores of analgesic polypharmacy use behaviors with non-medical indications than before and higher than the control group. This is in line with the previous study that found that the analgesic polypharmacy use behaviors with non-medical indications of population improved significantly after changing the service pattern. It can be explained that participants in the experimental group received more information about self-care behaviors by village health volunteers or healthcare providers from the program than the control group. Consequently, the experimental group changed their drug use behaviors more than the control group. The present study finding is also similar to the previous studies[22,23], which reported that after the intervention the experimental group tended to have better drug use behaviors than the control group.

The results in the present study corresponded to the social support theory since participants supported by village health volunteers and healthcare providers could modify behaviors better than before the intervention and the control after the intervention. When participants receive the right information from experienced persons, they can improve their knowledge and behaviors appropriately[12]. Therefore, social support can help people to deal with their personal health problems to prevent the consequences in the future.

Limitation and recommendation

The present study included only 60 participants. The findings might not be generalized to all targeted population in Phichit Province. The limitations that might affect the results were the other factors that the authors did not explore, such as perceptions about drug use and consecutive home visits to observe long term outcomes of the study. As a result, healthcare providers should utilize this program as guideline to improve drug use behaviors in targeted population.

Further studies should include perceptions and consecutive home visits to determine whether these factors influence the results. In addition, further studies should include qualitative techniques to collect in-dept information about drug use in the targeted population.

Conclusion

In summary, the program was effective in controlling analgesic polypharmacy use behaviors with non-medical indications since the experimental group could change their analgesic drug use behaviors significantly better than before the intervention and that of the control group after the intervention. Healthcare providers can utilize this program as a guideline for people to change their behaviors to reduce adverse drug reactions from analgesic polypharmacy use.

What is already known on this topic?

It is well-known that unreasonable drug use affects the health of people and economy of the country. Furthermore, previous studies showed that changing the behaviors for controlling analgesic polypharmacy use with non-medical indications among people in the community, intervention program is crucial.

What does this study add?

In the present study, the authors applied the social support theory to develop the intervention program for controlling analgesic polypharmacy use behaviors with non-medical indications among the population in Phichit Province, Thailand. After the intervention, the experimental group had significantly higher mean scores of knowledge about analgesic polypharmacy, and behaviors for controlling analgesic polypharmacy use with non-medical indications than before the intervention and better than the control group. Therefore, social support by village volunteers and healthcare providers affected controlling behavioral of analgesic polypharmacy use with non-medical indications among population in Phichit Province.

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Conflicts of interest

The authors reported no potential conflict of interest.

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