Effects of Smoking Cessation Program by Medications Use Reduction Tobacco Dependence Type Nicotine Gum and Vernonia Cinerea Lozenge with an Intensive Counseling and Behavioral Therapies at Home: A Case Study of Roi-Et Province

Tanaprat Thuksin[1], Prachumporn Lauprasert[2], Jariya Jiranukool[3]

[1]Doctoral Degree Student. Faculty of Public Health, Mahasarakham University, Mahasarakham, 44150, Thailand, [2]Doctor Prachumporn Lauprasert. Assistant Professor of Public Health. Faculty of Public Health, Mahasarakham University, Mahasarakham, 44150, Thailand, [3]Doctor Jariya Jiranukool (M.D.). Assistant Professor of Medicine. Faculty of Medicine, Mahasarakham University, Mahasarakham, 44000, Thailand

Abstract

Background: These guidelines were developed to assist patients who were addicted to cigarettes. **Method:** This quasi-experimental research aimed to evaluate the effects of a smoking cessation program by use of medications reduction tobacco dependence type nicotine gum and Vernonia cinerea lozenge via intensive counseling and behavioral therapies at home. The samples were 93 smokers and divided into 3 groups; 2 experimental groups and control group were chosen by randomized controlled trial and consider by random allocation method. Research instruments included a questionnaire and the smoking cessation program for 12 weeks. Data analysis consists of descriptive statistics, paired samples T-test and independent T-test. **Results:** The results revealed that after implementation, in terms average levels of exhaled CO and %COHb compared within the groups before experimental, points of prevalence abstinence (PAR) and continuous abstinence (CAR) were statistically significant at $p < 0.05$. The comparative between groups based on PAR and CAR were statistically significant at $p < 0.05$. However, the comparison of both groups was not significantly different. In total, the percentage of successful smoking cessation on basis in the experimental phase of PAR were 83.9, 67.7 and 32.3 respectively, and the percentage of CAR were 67.7, 54.8 and 25.8 respectively. **Conclusion:** In conclusion, the effects of the smoking cessation program showed that the reduction of exhaled CO, %COHb and the total of patients quitting smoke. The subjects who were already on the smoking cessation program responded more positively to treatment of tobacco dependence by nicotine gum than Vernonia Cinerea lozenge in cases of heavy smoking. However, collaborating with intensive counselling and behavioral therapies at home would have increased the results of smoking cessation.

Keywords: *smoking cessation program, medications use reduction tobacco dependence, nicotine gum, Vernonia cinerea, intensive counseling and behavioral therapies at home*

Corresponding Author:
Tanaprat Thuksin,
Doctoral degree Student
Address: Doctoral degree Student. Faculty of Public Health, Mahasarakham University, Mahasarakham, 44150, Thailand. **Tel:** +66877222077
E-mail: tanaprat.thu@msu.ac.th

Introduction

The smoking situation in Thailand has limited evidence of access to tobacco and supports interventions to stop smoking. In health services to help and support patients who are addicted to smoking because smoking increases the risk of death and premature death. Due to the relative risk of death among smokers and non-

smokers, smoking is the second leading cause of death in Thailand.[1] and smoking greatly increases the risk of death for 10 types of cancers, especially the lungs, laryngeal, esophageal, pancreatic, renal and bladder, cervical, endometrial and stomach, oral cavity, pharynx, acute myeloid leukemia[2] A 'premature death from smoking' is defined as a death from a smoking-related disease in an individual who would otherwise have died later from other diseases. On average, these premature deaths involve 10 years of life years lost.[3] NCDs have become a critical public health issue in Thailand. Deaths from NCDs accounted for 74% of the total 539,000 deaths in Thailand in 2016 and they are expected to continuously increase[2] and ratification of the Convention on Tobacco Control. Thailand has taken the tobacco control policy seriously, which has achieved remarkable success in reducing the overall smoking rate from 23% in 2003 to 19% in 2017.[4]

The tobacco control policy is an effective way to help people quit smoking and to assist and support smokers, which is an effective way to reduce the number of deaths. Smoking in Thailand has decreased, but there are still 10.7 million smokers as reported by the Thai National Statistical Office in 2017.[5] For the purpose of reaching a prevalence of 15.75 percent or less, this goal is what Thailand agreed to achieve in the WHO's Global Action Plan for the Prevention and Control of NCDs, 2013–2020, and the five-year National NCD Prevention and Control Strategy and Action Plan (2017–2021).[6] There is a process for quitting smoking in Thailand, although there is clear evidence that quitting smoking and smokeless tobacco will reduce the risk of CVDs immediately. There are only a few tobacco users who require more programmatic efforts and recommend the termination of tobacco use by health care providers. In respect of the health care providers at the smoking cessation clinic, nicotine is replaced by medications. Vernonia cinerea has been documented and widely used as a Thai traditional medicine for relieving nicotine craving. To evaluate the efficacy and safety of Vernonia cinerea use in an anti-smoking program as an alternative to smoking cessation by medication. The use of Vernonia cinerea as an alternative to the traditional smoking cessation of alternative medicine and the evaluation of efficacy are all antioxidant abilities which included the total of phenolics, catechin, flavonoid, Isoflavone, potassium chloride and potassium nitrate[7].

Therefore, the researcher aimed to evaluate effects of a smoking cessation program by medications use reduction tobacco dependence type nicotine gum and Vernonia cinerea lozenge with intensive counseling and behavioral therapies at home. To compare before and after implementation of the program in subjects practicing smoking cessation. This research also improved the smoking cessation program with a positive response to the medication use of tobacco dependency with intensive counseling, including behavioral therapies at home. In addition, there is also an increase in terms of success in quitting and relapse after quitting.

Objective

The objectives of the research were to evaluate effects of a smoking cessation program by medications use reduction tobacco dependence type nicotine gum and Vernonia cinerea lozenge with intensive counseling and behavioral therapies at home: A case study of Roi-Et province and to compare in terms of average level of exhaled carbon monoxide and carboxyhemoglobin before and after implementation of the program in groups and to compare between experimental groups and a control group.

Material and Methods

Research Design

This research was a total quasi-experimental research which aimed to evaluate the effects of smoking cessation program by medications use reduction tobacco dependence type, nicotine gum and Vernonia cinerea lozenge with intensive counseling and behavioral therapies at home. The samples were divided into 3 groups; 2 experimental groups and 1 control group included.

1. The experimental study (group 1) was a medication use in the type of nicotine gum via intensive counseling and behavioral therapies at home.

2. The experimental study (group 2) was a medication use in the type of Vernonia cinerea lozenge via intensive counseling and behavioral therapies at

home

3. The control group which was a non-medication use, but received the intensive counseling and behavioral therapies at home.

The period of this research was 12 weeks and chosen by randomized controlled trial and grouped for the experiment to consider by random allocation method. The research instruments of smoking cessation program for the 2 experimental groups by medication use which received nicotine gum (2mg/1gum) 1 gum/four times per day, PRN = 1 gum/four times per day (n=31) in experimental group 1, and the experimental group 2 which received Vernonia cinerea lozenge (200 mg/1 lozenge), 2 lozenges/four times per day, PRN = 2 lozenges/four times per day (n=31). The control group (n=31) which was non-medication use. Notwithstanding, the intensive counseling and behavioral therapies at home for 12 weeks and the follow up every week, after 4 week treatment by the intensive counseling and behavioral therapies at home the medication use were stopped. However, the intensive counseling and behavioral therapies at home were received for a further 12 week period with a follow up every week. Smoking status is created as self-reporting and confirmed at home by average level of exhaled carbon monoxide and carboxyhemoglobin. The primary end point was abstinence (PAR) at week 4. The second end is the continuous smoking cessation (CAR) at week 12. The smoking cessation program had 10 interventions for the behavioral therapies which were created and developed by the researcher and referenced to the 5A 5R 5D 3P model.[8] and from the practitioner guidelines for smoking cessation in Thailand.[9]

The 10 interventions for behavioral therapies guideline were included; 1. Stop the smoking cycle 2. The external stimulator and rejection skill 3. The internal stimulator 4. Body chemical reaction in smoking cessation 5. Health promotion activity in contentment therapy 6. Recreation therapy 7. Nutritional therapy 8. Naturopathy 9. Eliminating the cycle of relapse and 10. Volunteering therapy.

In addition, it should be at least 7 interventions per week, along with the intensive counseling at home. The intensive counseling had 2 processes which included; 1. A brief Intervention and 2. Intensive counseling at home. The process of counseling techniques included; 2.1 giving personal characteristics 2.2 allowing to counsel 2.3 collecting the data 2.4 stage of counseling techniques 2.5 participatory consultation methods and conclusions 2.6 evaluation of the consultation and the conclusion at the end of the consultation through the techniques of 5A 5R 5D and 3P which were used in the consulting process.

Population and Sample Characteristics Inclusion Criteria

The sample consisted of 93 smokers who had to quit smoking and divided into 3 groups, 2 experimental groups and 1 control group were selected by randomized controlled trial to be allocated periodically and considered in the total time of smoking, including cigarettes per day, Fagerstrom test evaluation level and age range.

Inclusion Criteria

1. The need of quitting smoking.

2. Disease and chronic health conditions that are dangerous for participation.

3. Smoking levels of Fagerstrom test during 4-10 points.

4. The minimum amount of 10 cigarettes per day.

5. Total time of smoking more than 1 year.

6. Age ranged between 15-59 year.

Exclusion Criteria

1. Rejection of treatment processes and medications in research study.

2. Chronic health conditions of Coronary artery disease, chronic heart failure, hypertension, anemia, acute renal failure, chronic renal failure, and hyperkalemia.

3.Other diseases in the case of a diagnosis for making decisions for the patients by experts safely.

Research Period

The research has been undertaken in 3 phases; pre-research, research, and post-research. Data were collected from July 1, 2018 to September 30, 2018, in research phases obtained over a 12 week period.

Research Instruments

The evaluation form was provided for participants to answer questions by themselves, and the test of evaluation form consisted of 2 parts:

Instruments for collecting data

Instruments for collecting data consisted of Demographic data that was a problem and smoking status.

Instruments of experimental

The instruments of quasi-experimental program had a guidebook of the experimental program for research assistants and patients. The experimental program encouraged smoking cessation by using 10 interventions for behavioral therapies with intensive counseling at home through 5A 5R 5D and 3P techniques of counselling process. The smoking cessation program was assessed over 4 weeks by point prevalence abstinence (PAR) and over 12 weeks by continuous abstinence (CAR) recording data by self-reporting and experimental result form, in terms of average levels of exhaled carbon monoxide, carboxyhemoglobin, counselling and behavioral therapies.

Data Collection

Before collecting data, ten registered district public health officers in who trained in the standard protocols and received a research assistance guidebook of the research program were assembled. The data were collected by the principal investigator and the other ten trained research assistants. The researcher and research assistants collected the data from 93 participants who were informed about this research and instructed in how to complete the evaluation form, including requesting consent by signing the research form. The data were corrected before and after the experimental phases. Afterward, collected assessment forms and questionnaires were checked for data accuracy then the results were put into a data entry in SPSS file format.

Data Analysis

Statistical method used to analyze the data was Statistical Package for the Social Sciences (SPSS) in the following aspects:

1. Descriptive statistics included the number, percentage, mean, standard deviation, minimum and maximum to indicate the general information and smoking situation of the participants.

2. Statistical use paired samples T-test and independent T-test to compare in the group before and after the experiment and comparing between groups to indicate in terms of average levels of exhaled carbon monoxide and carboxyhemoglobin, the number of cases which succeeded in smoking cessation in point prevalence abstinence (PAR) and continuous abstinence (CAR) (exhaled CO of PAR/CAR $\leq$10ppm., carboxyhemoglobin %COHb $\leq$1.60, Fagerstrom score test $\leq$ 3 point) and a p-value was considered statistically significant at $p < 0.05$.

Results

The effects of smoking cessation program using medication, nicotine gum and Vernonia cinerea lozenge through intensive counseling and behavioral therapies at home. The results revealed that the program in terms of problems and stations in this study showed that 93 participants who divided into 3 groups; 2 experimental groups and 1 control group. They showed most were male in 3 groups, there were 29 (93.5%), 30 (96.8%), 30 (96.8%) respectively and the age range in group 1 was between 45 - 60 years, there were 15 people (48.8%), group 2, 15 - 29 years, there were 13 people (42.0%) and control group, 45 - 60 years there were 13 people (42.0%). For educational levels, most graduated from high school and diploma were 12 (38.7%), 14 (45.2%), 15 (48.4%) respectively. Many of them were farmers 15 (48.4%), 13 (41.9%), 13 (41.9%) respectively. The average income for group 1 ranged between 10,001-15,000 baht, there were 15 (48.4%), for group 2, in the range of 15,001-20000 baht, there were 12 (38.7%) and control group, in the range of 10,001-15,000 baht, there

were 13 (41.9%). In respect of marital status, there were 22 (71.96%), 18 (58.1%), 21 (67.7%) respectively.

The table 1 showed that in terms of problems in family members, smokers were 85 people (91.4%). The total numbers of smoked cigarettes per day upper than 31 cigarettes, there were 32 people (34.4%) ($\bar{x}$ = 26.08 cigarettes smoked per day, S.D.= 9.759, Min= 11, Max= 40). The total period of smoking for upper than 10 years, there were 32 people (34.4%) ($\bar{x}$ = 11.46 year, S.D.= 7.561 ,Min= 2, Max= 30). The ages of starting smoking mostly 18, there were 33 people (47.3%) ($\bar{x}$ = 17.39, S.D.= 2.251, Min= 15, Max= 30). The type of cigarette mainly used was the ready-made cigarette, there were 93 people (100%). Drinking liquor through smoking, there were 93 people (100%). The intention of quitting smoking was uncertain in 93 people (100%). Experience of quitting smoking mostly was never attempted quitting smoking, there were 56 people (60.2%) and ever attempted quitting smoking, and there were 37 people (39.8%). Nonuse of medication for quitting smoking, there were 93 people (100%). The process of quitting smoking (n=56) by self-quitting smoking, there were 56 people (100%). For the congenital disease (n=8), diabetes mellitus type 2, there were 4 (4.4%), hepatitis B, there were 2 (2.2%), allergy, there was 1 (1.1%) and hypotension, there was 1 (1.1%).

Table-1: Problematic and predicament in smoking

Problematic and predicament in smoking	Number (person)	%
Family members smoking		
no	8	8.6
yes	85	91.4
Whose Family members smoking (n = 85)		
Father	85	100
Older brother	18	21.2
Younger brother	7	8.2
Total number of cigarettes smoked per day.		
11-20 cigarettes	31	33.3
21-30 cigarettes	30	32.3
≤31 cigarettes	32	34.4
(n = 93) ($\bar{x}$ = 26.08 cigarettes smoked per day ,S.D.= 9.759)		
Total time of smoking during (year)		
1-5 year	31	33.3
6-10 year	30	32.3
≤10 year	32	34.4
(n = 93) ($\bar{x}$ = 11.46 years ,S.D.= 7.561)		
Ages of starting smoking (year)		
15 year	33	35.5
18 year	44	47.3
20 year	15	16.1
30 year	1	1.1
(n = 93) (= 17.39 ,S.D.= 2.251)		

Cont... **Table-1: Problematic and predicament in smoking**

Type of cigarettes Rolling Tobacco cigarettes	 38 93	 40.9 100
Drinking liquor via smoking yes	 93	 100
Intention of quitting smoking Uncertain	 93	 100
Experience quitting smoking yes no	 37 56	 39.8 60.2
Use drugs or medication for quitted smoking Never use drugs or medication	 93	 100
A process to be quitted smoking (n = 56) Self quit smoking cold turkey	 56	 100
Congenital disease (n = 8) Diabetes mellitus type 2 Hepatitis B Allergy Hypotension	 4 2 1 1	 4.4 2.2 1.1 1.1

Data are presented as number (%) or mean ± SD

Table 2 to table 4 described the results revealed that the average levels of exhaled carbon monoxide and carboxyhemoglobin within the group before having the experiment, the point prevalence abstinence (PAR) and continuous abstinence (CAR) of two experimental groups and control group were statistically significant at $p < 0.05$. The results of comparison between groups before having the experiment were not significantly different. The comparisons between groups in the point prevalence abstinence (PAR) and continuous abstinence (CAR) were statistically significant at $p < 0.05$. However, the comparisons between groups in the experiment were not significantly different.

Table-2: The average levels of exhaled carbon monoxide and carboxyhemoglobin before experimental Stage of (PAR) and Stage of (CAR)

Exhaled CO and %COHb	Experimental group 1 (n = 31)		Experimental group 2 (n = 31)		Control group (n = 31)	
	$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.
Before experimental ExCO (ppm) (%COHb)	24.65 (3.940)	7.305 (1.167)	22.42 (3.587)	6.874 (1.099)	24.48 (3.969)	7.857 (1.299)
Stage (PAR) ExCO (ppm) (%COHb)	10.39 (1.661)	6.825 (1.091)	14.61 (2.338)	9.351 (1.496)	21.32 (3.411)	10.068 (1.610)
Stage (CAR) ExCO (ppm) (%COHb)	7.52 (1.202)	8.504 (1.360)	7.74 (1.238)	8.985 (1.437)	18.81 (3.112)	10.333 (1.757)

Data are presented as number (%) or mean ± SD

Table-3: Comparative within group of average levels exhaled carbon monoxide and carboxyhemoglobin

Variable	$\bar{x}$	S.D.	t	p-value
Comparative within group of average levels ExCO+%COHb pre-experimental and stage (PAR)				
Internal experimental group 1 (n = 31) Pre-experimental Stage (PAR)	24.65(3.940) 10.39(1.611)	7.305(1.167) 6.825(1.091)	14.336 (14.300)	0.001* 0.001*
Internal experimental group 2 (n = 31) Pre-experimental Stage (PAR)	22.42(3.587) 14.61(2.338)	6.874(1.099) 9.351(1.466)	5.969 (14.300)	0.001* 0.001*
Internal control group (n = 31) Pre-experimental Stage (PAR)	24.48(3.969) 21.32(3.411)	7.857(1.299) 10.068(1.610)	2.205 (2.361)	0.035* 0.035*
Comparative within group of average levels ExCO+%COHb pre-experimental and stage (CAR)				
Internal experimental group 1 (n = 31) Pre-experimental Stage (CAR)	24.65(3.940) 7.52(1.202)	7.305(1.167) 8.504(1.360)	11.093 (11.077)	0.001* 0.001*

Cont... **Table-3: Comparative within group of average levels exhaled carbon monoxide and carboxyhemoglobin**

Internal experimental group 2 (n = 31) Pre-experimental Stage (PAR)	22.42(3.587) 7.74(1.238)	6.874(1.099) 8.985(1.437)	10.277 (10.277)	0.001* 0.001*
Internal control group (n = 31) Pre-experimental Stage (CAR)	24.48(3.969) 18.81(3.112)	7.857(1.299) 10.333(1.757)	3.332 (3.969)	0.002* 0.008*
Comparative within group of average levels ExCO+%COHb stage (CAR)and stage (PAR)				
Internal experimental group 1 (n = 31) Stage (PAR) Stage (CAR)	10.39(1.611) 7.52(1.202)	6.825(1.091) 8.504(1.360)	3.369 (3.369)	0.001* 0.002*
Internal experimental group 2 (n = 31) Stage (PAR) Stage (CAR)	14.61(2.338) 7.74(1.238)	9.351(1.466) 8.985(1.437)	5.462 (5.462)	0.001* 0.001*
Internal control group (n = 31) Stage (PAR) Stage (CAR)	21.32(3.411) 18.81(3.112)	10.068(1.610) 10.333(1.757)	2.897 (1.935)	0.007* 0.042*

Significant at $p<0.05$*

Table-4: Comparative between group of average levels exhaled carbon monoxide and carboxyhemoglobin

Comparative between group of average levels ExCO+%COHb	$\bar{x}$	**S.D.**	**t**	**p-value**
Comparative between group Pre-experimental experimental group 1 control group	24.65(3.94) 24.48(3.96)	9.305(1.167) 7.857(1.299)	0.084 (0.090)	0.467 0.464
experimental group 2 control group	22.42(3.58) 24.48(3.96)	6.874(1.099) 7.857(1.299)	1.101 (1.249)	0.137 0.108
experimental group 1 experimental group 2	24.65(3.94) 22.42(3.58)	7.305(1.167) 6.874(1.099)	1.235 (1.227)	0.110 0.112
Comparative between group Stage (PAR) experimental group 1 control group	10.39(1.66) 21.32(3.41)	6.825(1.091) 10.068(1.610)	5.006 (5.006)	0.001* 0.001*

Cont... **Table-4: Comparative between group of average levels exhaled carbon monoxide and carboxyhemoglobin**

experimental group 2 control group	14.61(2.33) 21.32(3.41)	9.351(1.469) 10.068(1.610)	2.719 (2.179)	0.004* 0.004*
experimental group 1 experimental group 2	10.39(1.66) 14.61(2.33)	6.825(1.091) 9.351(1.469)	2.032 (2.032)	0.023* 0.023*
Comparative between group Stage (CAR) experimental group 1 control group	7.52(1.20) 18.81(3.11)	8.504(1.306) 10.333(1.757)	4.697 (4.785)	0.001* 0.001*
experimental group 2 control group	7.74(1.23) 18.81(3.11)	8.985(1.437) 10.333(1.757)	4.499 (4.595)	0.001* 0.001*
experimental group 1 experimental group 2	7.52(1.20) 7.74(1.23)	8.504(1.306) 8.985(1.437)	0.102 (0.102)	0.459 0.459

Significant at p<0.05*

The results revealed that successful smoking cessation within the groups in the point prevalence abstinence (PAR) and continuous abstinence (CAR) were statistically significant at $p < 0.05$. By exception, the control group was not significantly different. The results of the comparisons between groups in the point prevalence abstinence (PAR) were statistically significant at $p < 0.05$. And the comparisons between groups of experiment in the continuous abstinence (CAR) were not significantly different. In total, the successful smoking cessation based on the experimental groups and control group in the point prevalence abstinence (PAR), there were the percentage 83.9, 67.7, 32.3 respectively. In the continuous abstinence (CAR), there were the percentage 67.7, 54.8, 25.8 respectively. In conclusion, the successful smoking cessation of the experimental groups and control group, showed that the total cases of successful smoking cessation in the point prevalence abstinence (PAR) were 26, 21, and 10 cases respectively. The continuous abstinence (CAR), there were 21, 17, and 8 cases respectively

Conclusion and Discussion

The effects of smoking cessation program using medication, nicotine gum and Vernonia cinerea lozenge through the intensive counseling and behavioral therapies at home. The total results revealed that the experimental group 1, by using tobacco in the medication type of nicotine gum was evaluated that has the best effectiveness to aid quitting smoking in the point prevalence abstinence (PAR) and continuous abstinence (CAR). The evaluation of smoking cessation by measuring the level of carbon monoxide in the exhale, whose carbon monoxide levels in the exhale steadily decreased and the level of carbon monoxide in hemoglobin continually decreased also. However, in the point prevalence abstinence (PAR) smoking cessation, this might lead to patients who successfully quit smoking in the initial stages and might return to smoking due to stopping medication use and smoking habits. Using the proactive counseling and behavioral therapies at home were other ways to prevent smoking and it was a proactive process of quitting too. As shown in the results described using nicotine gum which found that the experimental group had no adverse effects from medication use and there was no overdose in nicotine replacement. Control the amount of nicotine in the body was achieved by using the recommended amount from the research and with a lower and constant amount,

which resulted in a decrease in cigarette cravings. For the duration of nicotine accumulation in the body, it was usually excreted in the form of cotinine within 4 days approximately and the half-life in the human body, only 16-18 hours. In some cases might return to smoking repeatedly because of taking the amount of nicotine 8 milligrams per day, it would relieve the nicotine withdrawal or withdrawal symptom from non-smoking in which was one of the main failure causes for smoking cessation. In this study found that Vernonia cinerea lozenge affected the rate of smoking cessation continuously for 7 days. Before the evaluation, no medication use or cravings were significantly lower in moderate nicotine addicts, but there were no statistical differences in low nicotine addicts. Therefore, Vernonia cinerea affected to smokers in nicotine addict and there were no reports of severe adverse reactions. From the results of this research on the use of Vernonia cinerea lozenge that were taken into the consideration of controlling dosage and time for daily usage of 3,000 milligrams per day[10]. When combining the pro re nanta (PRN) in medication used in the needs of smoking for 4 times by using Vernonia cinerea lozenge 200 mg. (16 lozenges). The amount received was 3,200 mg. per day and in the safe dose without the potassium toxic level. In Vernonia cinerea did not find severe adverse reactions occurred from use. By concluding from the study found that the rate of abstinence in the first phase of point prevalence abstinence (PAR) In which smoking assessments can be measured by monitoring the level of exhaled carbon monoxide ≤10 ppm Carboxyhemoglobin %COHb ≤1.60, Fagerstrom score test ≤ 3 point which can be considered they were not smokers[11].

However, it was found that the process of quitting smoking in the initial stages can increase the smoking addiction patients. But the continuous abstinence during the 12-week period showed a decrease in the number of patients who could quit smoking[12]. Due to the lack of exposure to cigarette cravings, there was a continuous period but to prevent nicotine addiction from medication use. Thus, overdose was necessary to control in the anti-smoking agents and used appropriately in nicotine withdrawal. To reduce the risk of side effects due to the long-term use of anti-craving substances that could be stabilized the rate of nicotine in the body for the long time. Therefore, it was better to use a method to reduce cravings continuously when the level of nicotine in the body was low and the craving for cigarettes was less, there was no symptoms of withdrawal, and the use of the medicine could stopped. Therefore, it was easier to quit smoking and not return to smoke through the use of proactive counseling, concise supervision, and behavioral therapy process at home until the end of the research schedule. From the statistical analysis, it was found that the overall in average levels of exhaled carbon monoxide and carboxyhemoglobin within the groups before the experiment, point prevalence abstinence (PAR) and continuous abstinence (CAR) of the two experimental groups and control group were statistically significant at $p < 0.05$[13]. The results revealed of comparison between groups before experiment were not significantly different. The comparisons between groups in the point prevalence abstinence (PAR) and continuous abstinence (CAR) were statistically significant at $p < 0.05$. However, the comparisons in both groups of experiments were not significantly different. The total success in smoking cessation for both of experimental groups and control groups, the percentages of point prevalence abstinence (PAR) were 83.9, 67.7, and 32.3, respectively and the percentages of continuous abstinence (CAR) were 67.7, 54.8, and 25.8, respectively[14]. The successful smoking cessation in the point prevalence abstinence (PAR) and continuous abstinence (CAR) were statistically significant at $p < 0.05$ exception in the control group was not significantly different. The results of the comparisons between groups in the point prevalence abstinence (PAR) were statistically significant at $p < 0.05$. In the comparisons between groups of the experiment, the continuous abstinence (CAR) was not significantly different. In the study of 43 people could stop smoking, representing 69.35% and 19 non-smokers, representing 30.65%[15]. Vernonia cinerea can be used to help stop smoking and has an effect on reducing the craving for cigarettes, including putrid cigarette smoke and in accordance with the research of[16]. The following up results showed that after 12 weeks of continuous abstinence (CAR) in the group of receiving Vernonia cinerea tea 28.1% and the group of substitute tea 12.5% (P=0.12) and taking for 24 weeks in the group of receiving Vernonia cinerea tea 18.8% and the group of substitute tea 9.4% (P=0.28). As

for the effects of smoking cessation throughout 1 week, the point prevalence abstinence (PAR) for 12 weeks, the results were in the group of receiving Vernonia cinerea tea 43.8% and the group of substitute tea 21.9% (P=0.06). And there were for 24 weeks in the group of receiving Vernonia cinerea tea 34.4% and the group of substitute tea 15.6% (P=0.08). They were accorded to the research[7] who found that the continuous abstinence (CAR) in week 4, it was 28.6% of studied group and 15.2% of control group (p=0.246) in the continuous abstinence (CAR. In the follow up phase in week 8, it was 28.6% of studied group and 12.1% of control group (p=0.135) and continuous abstinence (CAR). The follow up phase in week 12, it was 22.9% of studied group and 9.1% of control group (p=0.189). The rate of abstinence throughout 1 week in the point prevalence abstinence (PAR) in the week 4 was 31.4% of studied group and 27.2% of control group (p =0.793). The rate of abstinence throughout 1 weeknight the point prevalence abstinence (PAR), the follow up phase in week 8 was 34.3% of studied group and 18.2% of control group (p =0.173) and the rate of abstinence throughout 1 week in the point prevalence abstinence (PAR) The follow up phase in week 12 was 34.3% of studied group and 15.2% of control group (p =0.094). According to the research which found that in the Nortriptyline smoking cessation rate as the percentage of 16.8, 39.4, 73.7 and 75.2 respectively[17]. In the nicotine gum group, the rate of abstinence was calculated as a percentage of 18.1, 34.0, 67.4 and 70.5 respectively in month 1, 2, 3 and 4 (p =0.995 in month 4). The level of CO in month 4 was found that nicotine addicts with CO <10 ppm increased by 17.4 percent in the group of Nortriptyline and increased at 24.4 percent in the nicotine gum group (p = 0.758). In conclusion, the results of this study found that the effectiveness of quitting smoking in the Nortriptyline and nicotine groups during 4 months, there were no significant differences. According to the study at the end of this study in week 12, there was a low level nicotine addicts in the studied group and control group which had the continuous abstinence CAR in the percentage of 30.30 and 20.00 (p =0.327), in addition, there were the point prevalence abstinence (PAR) in the percentage of 42.42 and 37.14 (p =0.656) respectively[18,19,20]. The volunteers addicted to nicotine at the moderate level in the continuous abstinence was in the percentage of 42.86 and 13.64 (p =0.033). For the point prevalence abstinence (PAR) there were the percentage of 52.38 and 22.73 (p =0.044) respectively and adverse reactions of both groups were not different.

Ethical Clearance:

This research was approved for ethical certification by the Institutional Review Board of The Ministry of Public Health (Roi-Et Provincial Public Health Office) (reference number: HE 2561-01-5-032 / COE 29/2561). Participants could refuse and/or leave this research at any time. The data in the evaluation forms was kept confidentially without specifying the participants' names in the document. When the participants had completed their evaluation forms, they were sealed in the envelopes by themselves before returning to the researcher.

Conflict of Interests: This study has no conflicts of interest.

Source of Funding: This study was supported by Faculty of Liberal Arts and Science. Sisaket Rajabhat University. Sisaket Province, Thailand And Faculty of Public Health, Mahasarakham University.

References

1. National Statistical Office of Thailand. The cigarette smoking and alcoholic drinking behavior survey. Bangkok: Thai Ministry of Information and Communication Technology ; 2013.
2. World Health Organization. Noncommunicable diseases country profiles 2018. Geneva: World Health Organization; 2018.
3. US Department of Health and Human Services. The health consequences of smoking: a report of the surgeon general (p. 62). Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2014.
4. National Statistical Office of Thailand. The cigarette smoking and alcoholic drinking behavior survey. Bangkok: Thai Ministry of Information and Communication Technology; 2017.
5. Tobacco Control Research and Knowledge Management Center (TRC). The cigarette smoking behavior survey report. Mahidol University 2018;

1:42.

6. Pitayarangsarit, S., Garg, R., Khunsri, S., Thepsit, S., Apiya, T. Situation on NCDs prevention and control in Thailand. Nonthaburi: Department of Disease Control, Ministry of Public Health; 2018.
7. Thripopskul, W., Sithiphan, C. Efficacy of Vernonia cinerea for smoking cessation in Thai active smokers : A final report Tobacco Control Research and Knowledge Management Center (TRC). Nonthaburi: Thai Health Promotion Foundation; 2011.
8. Srimoragot, P**.** Thai alternative therapy for tobacco cessation. Up to you create new 2016; 4:304.
9. Rungruanghiranya, S. Thailand National Guidelines on somoking cessation. Bangkok: Sintaveekrit printing revision 2011;1: 140.
10. Chalermrueangrong, J. and Preechawong, S. Effect of the motivation program to quit smoking in Royal Thai Air Force officers with non-communicable disease risks. Journal of Health Research 2019; 33(5): 416-424.
11. International Health Policy Program Foundation. Thailand. NCDs situation report no.2: kickoff to the goals. Nonthaburi: Foundation, Thailand; 2016.
12. Klumchim, S. Relationship between perception from danger of secondhand smoke and health behavior among member in smoking family. Bangkok: Silpakorn University; 2008. [cited 2017 Jan 8]. Available from: http://www.thapra.lib. su.ac.th/ objects/thesis/fulltext/snamcn/Sanong_ Klumchim/Fulltext.pdf .
13. Story, L.E. & Brown, I. D. Investigation of Children's Attitudes toward Science Fostered by a Field-Based Science Methods Course. Science Education 1979; 63(1): 649-654.
14. US Department of Health and Human Services. The Health benefits of Smoking cessation. a report of Surgeon General. US Department of Health and Human Services. Public Health Service. U.S.A.: Centers for Disease Control. Centers for Chronic Disease Prevention and Health promotion Office on Smoking and Health; 1990.
15. Chaisawad, S., Makanuntachote, M. A study of smoking cessation therapy model using Vernonia cinerea Less and natural cure at Theng Hospital, Chiangrai. Nonthaburi: Office of the alcohol beverage and tobacco committee, Department of Diseases Control. Ministry of Public Health. Thailand; 1996.
16. Wongwiwatthananukit, S., Benjanakaskul, P., Songsak, T., Suwanamajo, S., Verachai, V. Efficacy of Vernonia cinerea for smoking cessation. Journal of Health Research 2009; 23(1): 31-36.
17. Kumsook, D. et al. Comparing the Effectiveness of Nortriptyline and Nicotine Gum with Pharmacist Counseling for Smoking Cessation in Nicotine Dependence Smokers. Isan Journal of Pharmaceutical Sciences 2014; 10(3): 372-388.
18. Srisoi, S. et al. Vernonia cinerea pastilles is effective for smoking cessation. Journal of Traditional and complementary Medicine 2020; 14(1): 1-5.
19. World Health Organization. The Health Consequences of Smoking: A Report of the Surgeon General. Office on Smoking and Health (US). The Health Consequences of Smoking: A Report of the Surgeon General. Atlanta (GA): Centers for Disease Control and Prevention (US); 2004. [cited 2017 Jan 8]. Available from: https:// www.ncbi. nlm.nih.gov/books/NBK44695/.
20. Yunibhand, J., et al. Predicting factors of smoking cessation among smokers calling Thailand National Quitline. Journal of Nursing Science and Health 2016; 39(1): 37-47.