Smoking Cessation Program for Thai Male Adolescents

Jintana Sarayuthpitak, Thanomwong Kritpet, Kasem Nakornkhet

Abstract: The purposes of this study were to: develop a smoking cessation program, based upon the Trans-theoretical Model of Health Behavior Change, Protection Motivation Theory and Theory of Reasoned Action, for Thai male adolescents; and, evaluate the effectiveness of the program using a pre-post test experimental design. The program consisted of 10 intervention activities (health assessment; smoke-free party; contracting; self-help manual; cessation counseling; buddy support system; social support; tailored messages; web-based information and counseling; and, relaxation techniques) developed for the purposes of enhancing knowledge about, attitude toward and cessation of cigarette smoking.

The effectiveness of the program was assessed using 40 purposively selected Thai male adolescents from two high schools in Bangkok. The 20 member experimental group participated in all the intervention activities, while the 20 member control group did not participate in the activities. Effectiveness of the program was assessed via examination of urine cotinine of the experimental and control groups. In addition, a pre and post-test evaluation was conducted regarding the subjects' knowledge about smoking, attitude toward smoking and attempts to stop cigarette smoking.

Following implementation of the program, the experimental group's urine cotinine levels were significantly lower and their post-test scores were significantly higher, than those of the control group. These findings suggest the program was effective in modifying the subjects' smoking behavior.

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Key words: Intervention activities; Smoking behavior changes; Thai male adolescents

Introduction

Since 1992, enforcement of laws that prohibit the sale and use of cigarettes to individuals under 18 years of age in public places, especially educational institutions, have been enforced throughout Thailand.[1] However, the Global Youth Tobacco Survey has identified Thailand as one of four Asian countries with the highest rate of cigarette smoking among adolescents, with the

Jintana Sarayuthpitak, *RN, PhD (Candidate) Faculty of Sports Science, Chulalongkorn University, Bangkok, Thailand.*
Correspondence to: Thanomwong Kritpet, *PhD. Associate Professor, Faculty of Sports Science, Chulalongkorn University, Bangkok, Thailand.*
E-mail: *Thanomwong.K@chula.ac.th*
Kasem Nakornkhet, *PhD. Assistant Professor, Knowledge Development Information and Policy for Physical Activity Promotion Plan Thai Health Promotion Foundation, Bangkok Thailand.*

smoking rate among Thai youth, 13 to 17 years of age, increasing from 20.3% in 2005 to 27.8% in 2006.[2, 3] This increase has been attributed to the 300% increase in smoking activity noted among 11 to 14 year olds between 1991 and 2006.

Although one-third of cigarette smokers, worldwide, express a desire to quit smoking, with the majority saying they can stop smoking without assistance, only 1% to 3% actually quit smoking.[4-9] Thus, it appears cigarette smokers need encouragement and appropriate interventions to achieve their goal to stop smoking.

In an effort to decrease the number of youth who smoke, the Thai government established, in 2002, the National Policies for Tobacco Control as a legal measure against the use of tobacco by children and adolescents.[10] However, there needs to be well-developed and effective interventions and programs, with theoretical underpinnings, that focus on increasing children's and adolescents' knowledge about, attitude toward, and cessation of cigarette smoking.[11-13] Due to their applicability to smoking behavior effects and attitudes, three theories considered appropriate for use in the development of an adolescent smoking cessation program are the: Trans-theoretical Model of Health Behavior Change (TTMHBC);[14] Protection Motivation Theory (PMT);[15-16] and, Theory of Reasoned Action (TRA).[17]

Theoretical Framework and the Literature Review

The *Trans-theoretical Model of Health Behavior Change(TTMHBC)*[14] addresses one's readiness to act on a new healthier behavior and provides ten processes of change (consciousness raising, dramatic relief, environmental re-evaluation, social liberation, self- reevaluation, stimulus control, helping relationship, counter-conditioning, reinforcement management and self-liberation) to guide the individual through five stages of change (pre-contemplation, contemplation, preparation, action and maintenance). According to the TTMHBC, change is a process involving progression through the five stages. The first stage, pre-contemplation, is when one does not intend to take action, in the foreseeable future (next six months) about an unhealthy behavior, while the second stage, contemplation, involves intent to change an unhealthy behavior in the next six months. Preparation, the third stage, occurs when a person intends to take action in the immediate future (within the next month). The fourth stage, action, is when one has made specific overt modification of his/her lifestyle within the past six months. The fifth and final stage, maintenance, involves working to prevent a relapse in behavior, but the individual does not apply change processes as frequently as he/she did in the action stage.

With respect to the ten processes of change, consciousness raising involves increased awareness about the causes, consequences and resolutions of a particular problem. Specific interventions for this process can involve such strategies as feedback, education, confrontation and media campaigns. Dramatic relief involves increased emotional experiences followed by reduced affect, if appropriate actions are taken. Specific interventions for this process can include psychodrama, personal testimonials, role playing and media campaigns. Environmental re-evaluation combines both cognitive and affective assessments of how a personal habit, such as smoking, affects one's social environment. A possible intervention for this process involves awareness of how one can serve as a role model for others. Social liberation deals with an increase in social opportunities or alternatives for individuals who are deprived or oppressed. Advocacy, empowerment opportunities and appropriate policies can increase opportunities for health promotion, such as providing smoke free zones. Self-reevaluation

combines both cognitive and affective assessment of one's self-image with and without a specific unhealthy habit, such as smoking. Value clarification, healthy role models and imagery are specific interventions one can use to deal with this process. Stimulus control involves removal of cues for unhealthy habits and provides healthier alternatives. To address this process, interventions can include avoidance, self-help groups and environmental re-engineering, such as providing a social situation where smoking is not allowed. Helping relationships involve the development of caring and supportive relationships with others. Counseling and developing a buddy system are two interventions that are appropriate for this process. Counter-conditioning involves learning healthier behaviors that can substitute for unhealthy behavior. Using relaxation techniques, such as nicotine replacements, are possible interventions for smokers dealing with this process. Reinforcement management addresses consequences for taking steps in a desirable direction. Positive reinforcement and group recognition for desirable behavior are two interventions that deal with this process. Finally, self-liberation is both the belief one can change and the commitment/recommitment to act on that belief. Having several choices can facilitate this process. In the case of smoking, possible interventions might include nicotine reduction, nicotine replacement or simply going "cold turkey." Prior research has noted the TTMHBC can be applied to specific groups, based on their readiness to quit smoking. [5, 14, 17-22]

The *Protection Motivation Theory (PMT)* [15] proposes we protect ourselves as a result of four factors: perceived severity of a threatening event (i.e. lung cancer); perceived probability of the occurrence or vulnerability (i.e. likelihood of getting lung cancer as a result of smoking); efficacy of recommended preventive behavior (i.e. perceived effectiveness of smoking cessation); and, perceived self-efficacy (i.e. one's level of confidence to engage in smoking cessation). Protection motivation is the result of threat and coping appraisal and serves as a mediating factor to arouse, direct and sustain protective health behavior. Once individuals, such as adolescents, are exposed to the possible deleterious effects of smoking and to actions they can take to prevent these effects, it is likely they will be better prepared to recognize and engage in behaviors that lead to smoking cessation.[15, 23]

The *Theory of Reasoned Action (TRA)*[17] suggests one's behavior is determined by his/her intention to perform the behavior; this intent is the function of the person's attitude toward the behavior and his/her subjective norms. Intention is the cognitive readiness for an individual to perform a specific behavior and is considered to be the immediate antecedent of behavior. The TRA holds a specific attitude toward a given behavior can help predict the occurrence of the behavior. In addition to attitude, one's subjective norms (beliefs about how people of importance to him/her view the behavior) also have an influence on his/her intention. With respect to adolescents, people of importance often include: parents, friends, peers, teachers and anyone who serves in a social role that inspires adolescents.[5,16, 24,25] As a general rule, the more favorable one's attitude and subjective norms are toward a specific behavior, the more likely he/she will have the intention to perform that behavior.

Although there are hospital-based smoking cessation programs available for a variety of age groups, throughout Thailand, none have proven to be effective.[26] Prior research has suggested it is desirable to use, with adolescent smokers, activities, such as those proposed by the TTMHBC, as smoking cessation interventions.[27-32] In addition, none of the prior programs have used the TTMHBC, PMT or TRA as a framework for their development. Therefore, based upon prior research and the premises of the TTMHBC, PMT and TRA, the purposes of

this study were to: develop a smoking cessation program for Thai male adolescents; and, evaluate the effectiveness of the program.

Method

Design: A pre-test/post-test experimental and control group design, with an intervention, was used in this study.

Ethical considerations: The Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University, and the Administrative Principals of the two high schools, used as the study sites, approved the study prior to data gathering. In addition, the parents of each adolescent subject signed a consent form to allow their child to participate in the study and each adolescent subject signed an assent form. The adolescents and their parents were provided with information regarding: the nature of the study; what would be involved to take part in the study; maintenance of confidentiality and anonymity; and, permission of an adolescent to withdraw from the study, at any time, without repercussions.

Setting and Sample: The study sites were two public high schools (grades 7-12), in Bangkok, that were receptive to being used as data collection sites. After being contacted and told about the study, the administrators of each school gave the primary investigator (PI) the names of 40 of their male students who smoked. The students then were interviewed, by the PI, to assure they met the inclusion criteria, and were informed about what participation in the study would entail.

To be included in the study, each potential male subject had to: be enrolled in one of the two high schools selected as a study site during the 2010 academic year; be 14 to 17 years of age; currently smoke less than 10 cigarettes daily; express a desire to quit smoking within the next one to six months; have tried, at least once, to quit smoking; have a urine cotinine level that indicated tobacco use (≥ 200ng/ml); be in stage 2 (contemplation) or stage 3 (preparation) of the TTMHBC; have parental consent to participate in the study; and, give assent to be in the study. To determine if they were in stage 2 or stage 3 of the TTMHBC, potential subjects were asked if they currently smoked. If they answered "yes," they were asked if they intended to quit smoking in the next 6 months. Those who responded positively to both questions were assessed as being in stage 2 (contemplation) of the TTMHBC. If they responded "no" to either of the questions, they were thanked for their time and excused from participation. All who responded positively to both questions then were asked if they intended to quit smoking over the next month, as well as if, over the past year, they had tried to quit or reduce the quantity of cigarettes they smoked. Those who answered "yes" to both questions were assessed as being in stage 3 (preparation) of the TTMHBC. In addition, because they wanted to quit smoking, the students gladly gave a urine sample, to be tested for cotinine, to determine if they were smoking. As a result of the PI's interview and the urine cotinine levels, 20 potential subjects, from each school, were eliminated.

The 40 remaining subjects (20 from each of the two high schools) were then purposively selected, to be in either the experimental or the control group. Subjects were purposively selected for either the experimental or the control group because one school allowed their students to be in the experimental group, while the other school allowed their students to be only in the control group. Thus, subjects were assigned to a group in accord with each school's directive. In addition, having the experimental and control groups in two separate schools helped prevent cross-contamination of information and experiences, related to smoking cessation, between the two groups.

The experimental group was comprised of 10th to 12th grade students all of whom were Buddhists and 16 to 19 years of age (mean = 17.05 years). Two (10%) of the students were in the 10th grade, 12 (60%) were in the 11th grade, and six (30%) were in the 12th grade. All of them stated they had tried, 1-10 times, to quit smoking. Although over one-third (n = 7; 35%) of their parents smoked, most (n =14; 70%) of their parents never had advised or warned them about the hazards of smoking. Eighteen members of the experimental group were in stage 2 and two were in stage 3 of the TTMHBC.

The control group also consisted of 10th to 12th grade students all of whom were Buddhists and 16 to 19 years of age (mean = 17.05 years). Three (15%) of the students were in the 10th grade, ten (50%) were in the 11th grade, and seven (35%) were in the 12th grade. All of them had tried, 1-10 times, to quit smoking. Even though less than a third (n = 6; 30%) of their parents smoked, the majority (n = 12; 60%) of their parents never had advised or warned them about of the hazards of smoking. Sixteen members of the control group were in stage 2 and four were in stage 3 of the TTMHBC. In addition, the subjects in both groups admitted smoking less than 10 cigarettes per day and having tried at least once, to quit smoking.

Instruments: Four instruments were used in the study: a Demographic Data Sheet (DDS); a urine cotinine test (UCT);[33] the Knowledge, Attitude and Smoking Cessation Questionnaire (KASCQ); and, a Parents' Questionnaire (PQ). The DDS, UCT and KASCQ were completed by the male adolescents, while the PQ was completed by the parents of the 40 adolescents.

The *Demographic Data Sheet* (DDS) requested information regarding each adolescent's: age; grade in school; religion; number of times attempts were made to stop smoking over the past 6 months; how many cigarettes were smoked each day; whether either parent smoked; and, whether either parent gave advice on the effects of smoking. It took approximately 5 minutes to complete the DDS.

The *urine cotinine* level of each subject was tested, by the PI, using a urine cotinine test (UCT) kit.[33] Cotinine is a chemical made by the body from nicotine, which is found in cigarette smoke. Each student was asked to go to the restroom, under the accompaniment of a male member of the research team, and place a sample of his urine into a labeled sterile cup, provided by the PI, and return the sample to the PI. The student's urine then was tested for cotinine, by the PI, in the activity room of each school, using a separate continine test kit for each student. To test for cotinine, the nicotine test disk, from the cotinine test kit, was removed from its foil wrapper and placed on a flat, dry surface. Two drops of a subject's urine was placed into the sample well of the disk. Five minutes later the results were read. As the nicotine test kit began to work, a purple band appeared in the left section of the results window to show the control line (C) was working properly. If another purple band appeared at the right section of the results window, the test band (T), a urine cotinine level ≥200 ng/ml was indicated. This result meant the subject had been smoking. It took approximately 10 minutes to carry out this test.

The 75-item Knowledge, *Attitude and Smoking Cessation Questionnaire (KASCQ)*, consisted of 3 parts and was developed by the PI based upon review of relevant literature. Part I consisted of 25 multiple choice items designed to obtain information about each subject's *knowledge about smoking.* Four items addressed diseases related to smoking; nine dealt with toxins in smoking; seven addressed second-hand smoke; three dealt with assistance needed with smoking cessation; and, two were related to smoking recidivism. Possible responses to items varied depending upon the item content. For

example, possible responses to one of the two recidivism items ("Which of the following statements is correct regarding a return to smoking after smoking cessation has occurred?") included: (a) "Returning to smoking does not mean I am addicted;" (b) "Smoking only one cigarette is not harmful;" (c) "By returning to smoking I have lost all previous efforts to stop smoking *(correct answer)*;" and, (d) "One has to smoke more than five cigarettes a day to be considered a returning smoker." Each item receiving a correct response was given a score of 1, while each item receiving an incorrect response was given a score of 0. Total scores could range from 0 to 25. Respondents who answered 70% to 100% of the items correctly were considered to have acceptable knowledge about smoking.

Part II consisted of 25 items that sought information about each subject's *attitude toward smoking*. Two items addressed diseases related to smoking; three dealt with toxins in smoking; three addressed second-hand smoke; eight dealt with assistance needed with smoking cessation; and, nine were related to smoking recidivism. An example of one of the recidivism questions was: "A person who smokes has more friends than a person who does not smoke." Each item had possible responses of: 1 = "strongly disagree;" 2 = "disagree;" 3 = "uncertain;" 4 = "agree;" and, 5 = "strongly agree." Respondents receiving an average score of 3.5 or higher were considered to have a positive attitude toward smoking.

Part III consisted of 25 items that sought information about each subject's *smoking cessation.* Four items addressed diseases related to smoking; one dealt with toxins in smoking; four addressed second-hand smoke; six dealt with assistance needed with smoking cessation; and, ten were related to smoking recidivism. An example of one question dealing with recidivism was: "Students smoke cigarettes when they are stressed." Each item had possible responses of: 1 = "never;" 2 = "sometimes;" 3 = "frequently;" and, 4 = "always." Respondents with an average score at or above 2.5 were considered to demonstrate adequate attempts to stop smoking. It took approximately 60 minutes to complete the entire KASCQ questionnaire.

Prior to its use in the study, the KASCQ was examined by five experts (one physician and one nurse who specialized in smoking cessation, two university professors with backgrounds in measurement and evaluation, and one high school health education teacher) regarding the congruence, reliability, discrimination and difficulty indexes for Part I of the instrument, and the congruence and reliability indexes for Parts II and III of the instrument. Part I (knowledge about smoking) was found to have an: index of congruence = 0.81; index of reliability = 0.88; index of discrimination = 0.47; and, index of difficulty = 0.47. Part II (attitude toward smoking) was found to have an index of congruence = 0.98 and an index of reliability = 0.94. Part III (smoking cessation) was found to have an index of congruence = 0.98 and an index of reliability = 0.96.

Prior to use in the study, the KASCQ was pilot tested on 45 male adolescents with characteristics similar to subjects used in the study. Reliability of Part I of the KASCQ was assessed by way of the Kuder-Richardson-20 statistic, while reliabilities of Part II and Part III were determined by Cronbach's alpha. The reliabilities for the pilot study were found to be 0.88 (Part I), 0.94 (Part II), and 0.96 (Part III). For the actual study, the reliabilities were found to be 0.88 (Part I), 0.78 (Part II) and 0.88 (Part III)

The *Parents' Questionnaire* (PQ) was a 10-item, researcher constructed, open-ended questionnaire that requested information about adolescent smoking and what they, as parents, had done to try to prevent their children from smoking. Examples of items in the questionnaire were: "Why do you think your

child started smoking?" and "What type of activities have you done to try to help your child stop smoking?" It took approximately 15 minutes to complete the questionnaire.

Preparation for the Development of the Smoking Cessation Program: The six week smoking cessation program was based upon the Trans-theoretical Model for Health Behavior Change (TTMHBC), Protection Motivation Theory (PMT), Theory of Reasoned Action (TRA) and review of relevant literature. The PI also obtained information about factors that lead to adolescent smoking from four school administrators (two from each study site school) and 14 teachers (seven from each study site school), who were authorities on health education related to tobaccos use, as well as from the 40 selected adolescents and their respective parents.

The four school administrators and 14 teachers were individually interviewed, for 30 minutes in their respective offices, regarding factors they believed contributed to adolescent smoking. Forty of the adolescents' parents (20 from experimental group and 20 from control group) were mailed the PQ and asked to return their completed questionnaire to the PI within two weeks. Information regarding factors the 40 adolescents felt contributed to them smoking, as well as activities they felt might assist them in smoking cessation, was obtained from them during two, 1½ hour each, PI conducted focus group sessions (one for experimental group and one for control group) at each school. Questions raised during the focus groups included: "What made you start smoking?" and "What kind of assistance do you need to stop smoking?" Information obtained from the administrators' and teachers' interviews, student focus groups sessions and Parents' Questionnaire were used in development of the 10 activities for the smoking cessation program.

Smoking Cessation Program: The researcher developed smoking cessation program consisted of 10 activities designed to enhance each subject's knowledge about, attitude toward and cessation of cigarette smoking. The activities included: health assessment; tailored messages; individual contracting; smoke-free parties; self-help manuals; cessation counseling; a buddy support system; social support; web-based information and counseling; and, a relaxation technique.

The *health assessment* required each adolescent to record, on a PI developed form, each day, during the 1st, 2nd and 3rd weeks of the program: whether he had smoked during the past 24 hours; if he smoked, how much he had smoked; the circumstances/ situations he felt contributed to him smoking when he smoked; the time of day he wanted to smoke; whether he tried not to smoke before he smoked; and, if he tried not to smoke, what methods he used.

Tailored messages (i.e. documents, posters, videos and published articles) were used to disseminate information about the hazards of smoking (i.e. diseases related to smoking, toxins in smoke and second-hand smoke). The information was provided, by the PI, four times during the program (twice during the 1st week and twice during the 2nd week).

Individual contracting required each subject to make a personal written contract, during the 3rd week of the program, to stop smoking. The 3rd week of the program was selected for contracting so the adolescents would have completed two weeks of health assessments and have engaged, four times, in tailored messages. Each subject then showed his dated contract, which included the date he planned to quit smoking and his plan regarding how he would keep from smoking, to the PI.

Smoke-free (no smoking allowed) parties: The research team hosted two, 3 hours each, smoke-free parties, the 4th and 6th weeks of the program, in the school's activity room. The focus of the parties was to demonstrate to adolescents they could have a good time without smoking. Snacks and fruit juices

were available during the party. The adolescents role-played: how to refuse to smoke; methods to use to quit smoking; and, how to assist others who want to stop smoking. They also competed with each other, for T-shirts or stationary, by responding to questions about smoking and watched videos about adolescents who successfully had quit smoking. Those who had not smoked for at least 7 days received accolades from all in attendance at the party.

Self-help manuals that were prepared by the PI were provided for subjects twice during the 5th and 6th weeks of the program. The manuals included information regarding: actions to take to stop smoking; practices to use in dealing with nicotine withdrawal; and, benefits of smoking cessation.

Cessation counseling, including advice and morale support concerning problems adolescents encounter related to smoking cessation success or failure, was provided once a week during the 5th and 6th weeks of the program, by the PI, a high school health education teacher for over 20 years. Disadvantages related to smoking (i.e. easily tiring during physical activities) also were addressed during the counseling sessions. At no time was blame stated, rather the adolescents continually were encouraged to work on smoking cessation. They also were encouraged, during the counseling sessions, to obtain additional consultation via the internet at: www.lerkburi.info.

The *buddy support system* involved having subjects paired together so each of them had a "buddy" with whom to share his smoking cessation experiences and difficulties. Each adolescent freely selected his own buddy. The buddy system was implemented during the 1st week of the program so subjects could share with each other throughout the program. The PI met twice with the adolescents during the 5th week of the program regarding how the buddy system was working.

Social support was provided via four PI-directed, 30 minute group sessions (one the 1st week, one the 2nd week and two the 3rd week). The sessions provided opportunities for subjects to share, with other members of the group, their smoking cessation successes. To assure truthfulness, those who said they had not smoked between the sessions were assessed for urine cotinine. The ones determined to have not smoked received compliments from the group members, as well as awards, i.e. T-shirts, stationary and books, from the research team. Parents also were made aware of their respective child's success and the awards he received.

Subjects were encouraged to obtain *web-based information and counseling* via internet searches (i.e. http://www.lerkburi.info) for information about the hazards of smoking, as well as advice regarding how to quit smoking. In addition, they were encouraged to share their findings and opinions with their friends and the research team. This activity was carried out twice during the 4th week of the program. Since all adolescents already had authorized school computer accounts to access various websites, the PI was able to monitor their website visits, as well as their sharing of information, via the web board, with other subjects.

The subjects were taught a 30 minute, 7-step *relaxation technique,* which they practiced twice (4th and 6th week) during the program. The technique started with: (1) sitting on a chair in a comfortable position, in a quite room, with eyes closed; then (2) slowly contracting, from toes to top of head, the different parts of the body; and, after the contracting, (3) slowly inhaling, while counting from 1 to 5, and slowly exhaling, while counting from 6 to 10. The first three steps (1-3) were done 10 times before the adolescent moved to the next two steps of the technique: (4) slowly closing the eyes and

inhaling, while (5) visualizing fresh air (which represented useful things) flowing into the lungs and spreading throughout the body. Finally, the last two steps of the relaxation technique involved the adolescent: (6) slowly exhaling the polluted air (which respresented non-useful things, such as toxins) out through the mouth, while (7) visualizing polluted air coming out of the lungs. The last 4 steps of the technique (4-7) were done 10 times.

Prior to implementation, the program's content and methods used for implementation were validated by the same five experts who assessed the KASCQ. The only change made in the program, per the experts' input, was making the activity names shorter and more understandable. For example, "wellness assessment, self observation and record" was changed to "health assessment," while "perception, analysis and data information" was changed to "social support." The index of congruence for the program, among the experts, was 0.76.

Procedure: After the adolescents were assigned to either the experimental or control group, the DDS and KASCQ were administered to them in an activity room at their respective schools. The demographic data from the two groups were found to be similar.

For six weeks, 3 days after completion of the DDS and KASCQ, the PI directed the experimental group in 30 minutes of smoking cessation program activities every Monday and Thursday in a group setting. None of the control group received the smoking cessation program activities. Six weeks after completion of the smoking cessation program activities, both the experimental and control groups were again administered the urine cotinine test (UCT) and the KASCQ, in an activity room, in their respective schools. Upon completion of the data gathering, the researchers offered to administer the smoking cessation program to adolescents in the control group. Because the administrators of the school that serve as the study site for the control group were unable to find a suitable time, control group members were not offered the smoking cessation program. However, the researchers did provide control group members with the tailored messages (i.e. documents, posters, videos and published articles), self-help manuals and website (www.lerkburi.info) the experimental group utilized.

Data Analysis: Descriptive statistics were used to analyze the demographic data. One-way multivariate analysis of variance (MANOVA) was used to determine the average score differences and compare the error and effect variance between the experimental and control group with respect to their knowledge of, attitude toward and cessation of cigarette smoking upon completion of the program. An independent t-test was performed to compare the score means between the two groups before and after the intervention. In addition, Chi-square was used to analyze the urine cotinine level differences between the experimental and control groups after completion of the program.

Results

Compared to the control group, the smoking cessation program was found to have a significant influence on the experimental group's knowledge about smoking, attitude toward smoking, and smoking cessation (See **Tables 1 & 2**). Following implementation of the smoking cessation program, the experimental group's urine continine levels were found to be significantly lower than those of the control group (See **Table 3**).

Table 1 Comparison of smoking behavior scores between the experimental and control groups regarding knowledge about smoking, attitude toward smoking and smoking cessation after completion of the smoking cessation program

Source of variation	Smoking behavior	SS	df	MS	F	*p*
Experimental group	Knowledge	129.600	1	129.600	14.816	0.000*
&	Attitude	2.663	1	2.663	25.325	0.000*
Control group	Cessation	3.969	1	3.969	29.355	0.000*
Error	Knowledge	332.400	38	8.747		
	Attitude	3.995	38	0.105		
	Cessation	5.138	38	0.135		
Total	Knowledge	9462.000	40			
	Attitude	576.381	40			
	Cessation	238.165	40			

*p <.05

Table 2 Comparison of the mean scores between the experimental and control groups regarding knowledge about smoking, attitude toward smoking and smoking cessation before and after completion of the smoking cessation program.

Description	Experimental group		Control group		t	*p*
	$\overline{X}$	SD	$\overline{X}$	SD		
Before program						
Knowledge	10.300	3.540	9.650	2.661	0.656	0.516
Attitude	3.460	0.481	3.256	0.330	1.563	0.126
Cessation	2.334	0.516	2.236	0.454	0.816	0.527
After program						
Knowledge	16.500	3.914	13.200	2.262	3.265	0.003*
Attitude	4.032	0.263	3.516	0.375	5.032	0.000*
Cessation	2.708	0.402	2.078	0.330	5.418	0.000*

* p <.05

Table 3 Results of urine cotinine levels between the experimental group and the control group

	After the smoking cessation program					
	Cotinine level ≤200ng/ml (non-smokers)		Cotinine level ≥200ng/ml (smokers)		χ^2	*p*
	n	%	n	%		
Experimental group	16	80	4	20	19.798	.000*
Control group	2	10	18	90		

*p <.05

Discussion

The findings from this study showed, compared to the control group, the experimental group had higher average scores regarding knowledge about smoking, attitude toward smoking and smoking cessation upon completion of the smoking cessation program. In addition, compared to the control group, the experimental group had significantly lower urine cotinine levels upon completion of the smoking cessation program. Such findings suggest the smoking cessation program had a significant influence on the adolescents involved in the program (experimental group). Such findings are similar to prior research that used some of the activities included as part of this smoking cessation program. For example, Maansi and colleagues[34] found counseling and providing detailed information about the effects of smoking had a significant influence on one's knowledge about smoking. In fact, the students in this study verbally indicated the positive impact information about smoking had upon them. Similar to the findings of this study, the use of the internet to obtain useful information about smoking and to share the information with others was found, by Chen and Yeh,[19] to be a positive experience for adolescents attempting to stop smoking. Also similar to findings of this study, Ham and Lee[21] found, among Korean adolescents, realization about the negative effects of using cigarettes, through peers, provided a more positive attitude regarding smoking cessation. Relaxation techniques, as demonstrated by this study, as well as in prior research,[22] are effective in helping to control the urge for nicotine. Finally, similar to the suggestions of Segan and associates,[35] this study's smoking cessation program revealed the importance of including discussion sessions and consultation as part of a smoking cessation program.

Conclusions, Limitations and Recommendations

This study's findings demonstrated the effectiveness of using multiple activities when developing and implementing a smoking cessation program for adolescents, as well as the use of the three theoretical models (Trans-theoretical Model for Health Behavior Change, Protection Motivation Theory and Theory of Reasoned Action) used to design the smoking cessation program. All of the activities used in the study, as well as use of the theoretical models should be given serious consideration when developing future smoking cessation programs.

The fact this study had limitations should be taken into account when examining and applying the findings. For example, the sample size of both the experimental and control groups was small, only male students served as subjects and only two schools, in one geographic area, served as study sites. Thus,

generalizability of the findings to other schools within Thailand is limited. Therefore, future studies need to: (a) use a larger sample size that includes both male and female subjects and (b) use study sites in a variety of geographical areas throughout Thailand. Also, it would be of interest to compare the effectiveness of this type of program between male and female adolescents.

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โปรแกรมการเลิกสูบบุหรี่ของวัยรุ่นชายไทย

จินตนา สรายุทธพิทักษ์, ถนอมวงศ์ กฤษณ์เพ็ชร์, เกษม นครเขตต์

บทคัดย่อ: วัตถุประสงค์ของการวิจัย เพื่อพัฒนาโปรแกรมเลิกบุหรี่สำหรับวัยรุ่นชายไทย โดยใช้ทฤษฎีขั้นตอนการเปลี่ยนแปลงพฤติกรรม ทฤษฎีแรงจูงใจเพื่อป้องกันโรค และทฤษฎีการกระทำด้วยเหตุผล และเพื่อประเมินประสิทธิผลของโปรแกรม ใช้การวิจัยกึ่งทดลองแบบ 2 กลุ่มเปรียบเทียบก่อนและหลังการทดลอง โปรแกรมประกอบด้วย 10 กิจกรรม (1. สังเกตตนเอง 2. รู้เท่าทันบุหรี่ 3. เสริมแรง 4. คำมั่นสัญญา 5. ปาร์ตี้ไร้ควัน 6. ฝึกจิตสมาธิ 7. ข้อมูลออนไลน์ 8. บัดดี้พาเลิก 9. รับรู้สู่ปฏิบัติ และ 10. รับคำปรึกษา) เพื่อเพิ่มความรู้ เจตคติ และความพยายามเพื่อเลิกบุหรี่

การประเมินประสิทธิผลของโปรแกรมใช้กลุ่มตัวอย่างเป็นวัยรุ่นชายไทยโดยการเลือกแบบเจาะจงจำนวน 40 คน จากโรงเรียนระดับมัธยมศึกษาตอนปลายจำนวน 2 โรงเรียนในกรุงเทพมหานคร โดยนักเรียนกลุ่มทดลอง 20 คน จาก 1 โรงเรียนเข้าร่วมกิจกรรมที่ใช้แทรกแซงทั้งหมด และนักเรียนอีก 20 คน จากอีก 1 โรงเรียน เป็นกลุ่มควบคุมที่ไม่ได้เข้าร่วมกิจกรรม เพื่อเปรียบเทียบโคตินินในปัสสาวะของ 2 กลุ่ม ร่วมกับการทดสอบความรู้ เจตคติ และการปฏิบัติในการเลิกบุหรี่ ก่อนและหลังการทดลอง

ผลการทดสอบพบว่าโคตินินในปัสสาวะของกลุ่มทดลองต่ำกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ ในขณะที่คะแนนความรู้ เจตคติ และความพยายามเพื่อเลิกบุหรี่ สูงกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ ผลการวิจัยแสดงให้เห็นว่าโปรแกรมมีประสิทธิผล ทำให้วัยรุ่นชายไทยเปลี่ยนแปลงพฤติกรรมการสูบบุหรี่

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คำสำคัญ: กิจกรรมแทรกแซง/ การปรับเปลี่ยนพฤติกรรมการสูบบุหรี่/ วัยรุ่นชายไทย

จินตนา สรายุทธพิทักษ์, *RN, PhD (Candidate) หลักสูตรวิทยาศาสตรดุษฎีบัณฑิต (วิทยาศาสตร์การกีฬา), คณะวิทยาศาสตร์การกีฬา จุฬาลงกรณ์มหาวิทยาลัย กรุงเทพมหานคร ประเทศไทย*

ติดต่อที่: ถนอมวงศ์ กฤษณ์เพ็ชร์, *PhD, รองศาสตราจารย์ คณะวิทยาศาสตร์การกีฬา จุฬาลงกรณ์มหาวิทยาลัย กรุงเทพมหานคร ประเทศไทย*

E-mail: *Thanomwong.K@)chula.ac.th*

เกษม นครเขตต์, *PhD, ผู้ช่วยศาสตราจารย์ แผนงานพัฒนาองค์ความรู้ ข้อมูลข่าวสาร และนโยบาย เพื่อการส่งเสริมกิจกรรมทางกาย สสส." กรุงเทพมหานคร ประเทศไทย*