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Effectiveness of a smoking cessation program on self-esteem, attitude, perception, and practice regarding control over smoking among male high school

Niyom Junnual and Chulaporn Sota
Faculty of Public Health, Khon Kean University, Khon Kean, Thailand, and
Anun Chaikoolvatana
College of Medicine and Public Health,
Ubon Rajathanee University, Ubon Ratchathani, Thailand

Abstract

Purpose – The smoking rate of male high school students continues to increase. Therefore, the purpose of this paper is to examine the effectiveness of a smoking cessation program on self-esteem, attitude, perception and practice regarding smoking behavioral control among male high school students in Ubon Ratchathani Province, Thailand.

Design/methodology/approach – The effectiveness of the smoking cessation program was tested by a quasi-experimental pre-posttest and follow-up with a 24-week design. Multistage sampling was used to recruit 70 male high school students, including 35 male students in the intervention group and 35 male students in the control group. The intervention group received a 12-week smoking cessation program based on information-motivation-behavioral skills and stages of change models and follow-up at 12 weeks, whereas the control group did not. A self-administered questionnaire was used to assess the improvement of subjects' self-esteem, attitude toward smoking, perceived control over smoking, number of cigarettes per day and urine cotinine test. The descriptive statistics, generalized estimating equation and proportion test were used for data analysis.

Findings – After the program, there were statistically significant differences in mean scores between the group and control groups; the difference of self-esteem was 4.15 (95% CI: 1.95, 6.36), attitude toward smoking was 3.30 (95% CI: 1.89, 5.52) and perceived control over smoking was 6.99 (95% CI: 4.04, 9.94). Thus, all differences in the intervention group were significantly higher than in the control group. The proportion of non-smokers, measured by the urine cotinine test at follow-up, was 25 percent (95% CI: 0.03, 0.48) significantly higher (p-value = 0.015), in the intervention group. Therefore, the smoking cessation program in this study was effective at changing the behavior of male high school student smokers.

Originality/value – This smoking cessation program increased self-esteem, attitude toward smoking, perceived control over smoking and decreased smoking per day among male high school students. Therefore, schools and parents should focus on developing these factors to encourage students to quit smoking.

Keywords High school, Male students, Smoking cessation programme

Paper type Research paper

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Introduction

Smoking continues to be a prevalent cause of premature death and illnesses such as chronic lung cancer and cardiovascular disease[1]. Worldwide, in 2017, there was an estimated 1 billion smokers and more than 7 million smoker related deaths[2]. A survey of young people aged 15 and older in Thailand found that the average age of regular smoking began at 17.8 years and became a habit at 19.5 years. Among 15–18 year olds, 8 percent were regular smokers[3]. Meanwhile, 50,737 Thai citizens died from lung cancer, coronary heart disease and emphysema caused by smoking[4]. In 2015, the statistics of Ubon Ratchathani province showed that 22.1 percent of the local population were smokers, and 8.4 percent were smokers from the age of 15to 18, with the average age of beginning to smoke being 17.3 years old[3].

Most of Thailand's smokers have tried to overcome their addiction habits on their own but were successful for an average of three months[5]. One of the reasons for the failure to quit smoking is an addiction to nicotine. There have been interventions such as nicotine replacement therapies, but programs to reduce smoking have shown to be beneficial only to a certain extent, as only one-third of adolescents have successfully quit smoking[6, 7]. Studies found that the most effective strategy would be to provide youth with a variety of therapies and supportive care options, as everyone does not use the same coping mechanisms. It found that the factors associated with the success of smoking cessation in adolescents were their intentions, effort and motivation to quit smoking, the interaction between bad attitudes toward smoking and self-efficacy in smoking control, and support from family and friends[8–11]. It found that self-efficacy in controlling smoking was the most important factor that correlated with successful smoking cessation. Preparedness and need assessments of smokers are the keys to success in designing a cessation program.

Literature reviews revealed that the behavioral stages of change model[12–15] have been applied to smoking cessation both within the country and abroad. Smokers were classified in the individual preparedness and need assessments following the stages of change[16]. Most research designed with smoking cessation programs that applied the stages of change were designed for both individuals and groups of smokers, but there is little research using both the information-motivation-behavioral (IMB) skills[17] and stages of change models to create a smoking cessation program for male high school students. This study aims to examine the effectiveness of the cessation program on self-esteem, attitude, perceptions and practices regarding smoking control among male high school students in Ubon Ratchathani province.

Methodology

Study design

The quasi-experimental study involved a smoking cessation program (over 12 weeks) with an intervention group of high school student smokers. The control group used male student smokers in another school with characteristics similar to the intervention school. Both the intervention and control groups were interviewed three times (at 1, 12 and 24 weeks).

Study procedure

The sample size was calculated using Stanley Lemeshow's[18] formula to determine the number of male students in the intervention and control groups with alpha error $= 0.05$ and power of test $= 0.90$. The difference in the means for smoking behavior among male adolescents before and after program implementation[19] was set at 0.63. There were 35 students needed for each group. To recruit participants, a multistage sampling technique was applied. First, the secondary education service area 29 at Ubon Ratchathani included six groups. One school per group was randomly selected and the population of male high

school students was then surveyed. Second, two high schools among the six schools which had the highest number of smokers were selected. Third, one random high school was designated the intervention group, and one high school was designated as the control group. Fourth, to select the intervention group, the inclusion criteria were male high school student smokers who had a nicotine addiction with a score of 3 or more (based on the Fagerstrom Test for Nicotine Dependence), had either thought about quitting or had tried quitting smoking (stages of change model)[12], had never attended any activity or joined any quitting programs, and wanted to participate in the trial and returned a consent form signed by the participant and a parent. Each criterion was calculated and required 35 participants in the intervention group and 35 participants in the control group. All participants in each group remained throughout the 24 weeks of the study.

The smoking cessation program developed for male high school student smokers was based on IMB skills and on the stages of change. The contemplation or preparation step was applied to prepare the participants in accordance with the stages of the change model. Then, activities in line with behavioral change according to the stages of change were designed. The activities focused on the development of information needed to quit smoking, motivation to quit smoking and smoking cessation skills in accordance with the IMB skills concept. This smoking cessation program was validated by three experts in smoking cessation and public health. The index of item-objective congruence (IOC) was used to assess the content validity of this program because the researcher was keen to ensure that the validity matched the correct objectives and fitted the program's content. IOC for all items of this program ranged from 0.67 to 1.00. The smoking cessation program consisted of six activities carried out once a week for 12 weeks, which were as follows:

(1) introduction to the program and getting to know oneself and choosing a path to motivate participants to be aware of their options to quit smoking and to decide to quit smoking;

(2) self-esteem to encourage participants to realize their capability and raise their expectations to quit smoking;

(3) alternative solutions to quit smoking for participants to select activities or skills to quit smoking by themselves;

(4) counseling for participants to get support and advice about quitting smoking;

(5) learning and exchanging experiences to stimulate and increase participants' awareness of how to continually practice quitting smoking; and

(6) willpower to reflect on participants' problems and to empower them to quit smoking.

Most of the activities emphasized an edutainment concept. Ice-breaking, lectures, group discussions, brainstorming, counseling, reflect-connect-apply practice and role-playing were used.

Measurements

There were two measurement instruments in this study. First, a standard questionnaire developed from theory and previous studies was used for data collection[11, 20, 21]. The questionnaire was validated by three public health and smoking cessation experts and the index of IOC of all items ranged from 0.51 to 0.89. To test the reliability of the questionnaire, a pilot study was conducted with a sample of 30 students who had similar characteristics to the respondents. The pilot study was conducted in a school of similar size but in another district. The questionnaire consisted of four parts. Part 1 was about socio-demographic characteristics; the demographic variables included age, level of education, grade point average (GPA), people living with the respondent, type of residence, daily expenses and congenital disease. Part 2 was self-esteem; this measure was classified into another four

categories (total self-esteem, self-esteem toward society, self-esteem toward family and self-esteem in education), consisting of 20 items. The scale for measuring was a five-point Likert type scale ranging from 1 = not at all to 5 = a great degree. The internal consistency reliability (Cronbach's α) was 0.71. Part 3 was the participant's attitude toward smoking; this measure was classified into two categories (belief toward smoking results and perceived barriers toward smoking), consisting of ten items, also using a five-point Likert-type scale. The internal consistency reliability (Cronbach's α) was 0.93. Part 4 was the perceived control over smoking, and this measure was classified into two categories (knowing the ability to control smoking and the expected outcome of smoking control), consisting of ten items measured using a five-point Likert-type scale. The internal consistency reliability (Cronbach's alpha) was 0.94. The second measurement, cotinine level, was tested by a one-step cotinine test device that tests cotinine in the urine. The qualitative result used the principles of a competitive immunoassay. The control zone is enameled by cotinine antibody-gold conjugate, and the test zone was enameled with cotinine antigen. Results can be read by observing the color code after dropping urine. If the result is red in the control and test zones, there is no cotinine. If the result is red only at the control zone, then there is cotinine in the urine. The cotinine/nicotine drug testing kit is positive if the cotinine level $\geqslant$ 200 ng/ml, meaning that the students had been smoking. If the level was $<$ 200 ng/ml, then the students had not smoked recently. The testing kit has a 98 percent sensitivity and 99 percent specificity rating.

Ethical considerations

The Ethics Review Committee for Human Research Subjects of Khon Kaen University approved this study with a certified code as HE602081.

Data analysis

The data analysis was carried out using SPSS version 19 (licensed by Khon Kaen University). Socio-demographic characteristics between the groups were analyzed in terms of frequencies and percentages. Socio-demographic differences between the two groups were tested using χ^2 tests, Fisher exact tests and an independent *t*-test. Normality was tested for self-esteem, attitude toward smoking, perceived control over smoking and smoking per day within each group. The independent *t*-test was used for comparing self-esteem, attitude toward smoking, perceived control over smoking and smoking per day between the groups. The effectiveness of the program evaluated the difference between groups by using a generalized estimating equation for self-esteem, attitude toward smoking, perceived control over smoking and smoking per day between groups with a 95% CI and *p*-value of 0.05. Comparisons of different levels of cotinine between groups were tested by a proportion test with a 95% CI and *p*-value of 0.05.

Results

Data were collected by questionnaire and one-step cotinine test device results from 70 participants, including 35 participants in the intervention group and 35 participants in the control group. The results were as follows.

Table I showed the socio-demographic characteristics. The participants in the intervention and control groups were not significantly different in age, level of education, GPA, type of residence, daily allowance and congenital diseases (p-values > 0.05). The average age in the intervention group was 16.80 years (SD = 0.96), similar to the control group. The intervention participants had an average GPA of 2.57 (SD = 0.70), and the approximate GPA of the control group was 2.68 (SD = 0.28). Most of the intervention participants lived with their parents. The average daily living expenses totaled 70.86 baht (SD = 24.29) in the intervention group and 60.57 baht (SD = 24.12) in the control group. Most of them had no underlying diseases.

Socio-demographic characteristics	Intervention group ($n = 35$) Number (%)	Control group ($n = 35$) Number (%)	p-value
Age	$\bar{x} = 16.80$ (SD = 0.96)	$\bar{x} = 16.57$ (SD = 0.81)	0.288[a]
Level of education			0.068[b]
Grade 10	6 (17.10)	14 (40.00)	
Grade 11	14 (40.00)	13 (37.10)	
Grade 12	15 (42.90)	8 (22.90)	
GPA	$\bar{x} = 2.57$ (SD = 0.70)	$\bar{x} = 2.68$ (SD = 0.28)	0.39[a]
Living with			0.319[c]
Both parents	25 (71.40)	20 (57.10)	
One parent	4 (11.40)	8 (22.90)	
Relative	5 (14.30)	5 (14.30)	
Alone	–	2 (5.70)	
Teacher	1 (2.90)	–	
Type of residence			0.491[c]
Home	34 (97.10)	33 (94.30)	
Dorm	–	2 (5.70)	
Boxing camp	1 (2.90)	–	
Daily allowances	$\bar{x} = 70.86$ (SD = 24.29)	$\bar{x} = 60.57$ (SD = 24.12)	0.080[a]
Congenital diseases			0.301[c]
None	32 (91.40)	30 (85.70)	
Allergies	–	2 (5.70)	
Asthma	–	2 (5.70)	
Anemia	1 (2.90)	1 (2.90)	
Gastritis	2 (5.70)	–	

Notes: [a]Independent samples t-test; [b]χ^2 test; [c]Fisher exact test

Table I.
Baseline socio-demographic characteristics of the intervention and control groups

Table II showed the effectiveness of the smoking cessation programs by comparing the difference between students' self-esteem, attitude toward smoking, perceived control over smoking and smoking per day between the intervention group and the control group. The intervention group had statistically significant differences in self-esteem, attitude toward smoking and perceived control over smoking compared to the control group. The significant mean score difference between the intervention and control groups' self-esteem was 4.15 (95% CI: 1.95, 6.36), attitude toward smoking was 3.30 (95% CI: 1.89, 5.52) and perceived control over smoking was 6.99 (95% CI: 4.04, 9.94). When compared, the intervention group's scores were significantly improved over that of the control group. Even though the mean difference score of cigarettes intake per day was not significantly different between groups, in the follow-up period, the average number of cigarettes per day in the intervention group was significantly different compared to the control group, at 1.48 (95% CI: −2.62, −0.34). The proportion of cotinine concentration in urine in the 12-week follow-up among the intervention group was significantly higher than the control group at 25 (95% CI: 0.03, 0.48) (Table III).

Discussion

The evaluation of the smoking cessation program for male high school students was done under six main components, namely, intrapersonal choice of pathways, self-esteem, alternatives to smoking, the secret technique of smoking cessation, counseling and moral support. The activities are determined by internal behavior. The smoking cessation programs significantly improved students' self-esteem, attitude toward smoking and perceived control. At the end of the smoking cessation programs, the mean difference of self-esteem in the intervention group was significantly higher than that of the control group,

Trial period	Intervention group (n = 35) Mean	SD	Control group (n = 35) Mean	SD	Mean difference	95% CI	p-value
Self-esteem	63.63	0.74[a]	59.40	0.49[a]	4.15	1.95, 6.36	< 0.001
Before trial	61.11	8.08	58.71	5.04	2.40	−0.88, 5.56	0.152
After trial	64.60	7.75	58.77	5.09	5.82	2.69, 8.95	< 0.001
12-week follow-up	65.20	6.63	60.65	4.85	4.54	1.76, 7.31	0.002
Attitude toward smoking	35.53	0.77[a]	32.20	0.33[a]	3.30	1.89, 5.52	< 0.001
Before trial	34.80	6.15	32.22	3.36	2.57	−0.58, 4.35	0.133
After trial	36.45	7.03	32.17	3.38	4.28	1.65-6.91	0.002
12-week follow-up	35.34	6.12	32.20	3.36	3.14	0.78-5.49	0.010
Perceived control over smoking	37.90	0.80[a]	33.52	0.60[a]	6.99	4.04, 9.94	< 0.001
Before trial	36.94	7.94	33.37	6.32	3.57	0.14, 6.99	0.042
After trial	38.57	8.72	33.57	6.29	3.87	0.27, 7.47	0.035
12-week follow-up	38.20	8.25	33.62	6.25	4.07	0.48, 7.67	0.027
Number of cigarettes per day	3.90	0.22[a]	4.65	0.24[a]	0.69	−0.21, 1.61	0.134
Before trial	5.17	2.35	5.06	2.36	0.11	−1.01, 1.24	0.840
After trial	3.88	1.88	4.74	2.30	0.88	−1.88, 0.11	0.083
12-week follow-up	2.69	1.84	4.17	2.84	1.48	−2.62, −0.34	0.012

Note: [a]SE

Table II. Comparison of self-esteem, attitude, smoking, perceived control over smoking and smoking per day scores between the intervention and control groups by a generalized estimating equation

Trial period	Intervention group (n = 35) %	Control group (n = 35) %	Proportion difference	95% CI	p-value
After trial	42.00	25.00	17.00	−0.04, 0.39	0.065
Follow-up result	60.00	34.00	25.00	0.03, 0.48	0.015

Table III. Comparison of not smoking by urine cotinine test between the intervention and control groups, after intervention and follow-up by proportion test

which is correlated with many studies including that of Kim[13], who studies the effects of a self-esteem and smoking cessation self-efficiency improvement program on smoking high school students in a quasi-experimental study. The study is also consistent with Ha and Choi's quasi-experimental study[22] researching the effectiveness of the self-determination theory based on a motivational interviewing program called YOU-TURN for smoking cessation among adolescents, and Kim[23], who studies the effects of a self-esteem and smoking cessation self-efficiency improvement program on high school students who smoke. Due to the variety of activities, students can develop their self-esteem and are encouraged to identify their aptitude for various activities. The activities focus on teaching student's self-aptitude, self-efficacy, self-prominence and weak points, self-acceptance and self-worth. These practices are important for creating long-lasting changes in behaviors according to Coopersmith[24], who studies how the process of developing self-esteem must create activities for a person to have an experience, such as a self-survey activity, self-worth activity and self-developing processes. The important qualities needed to help reach behavioral change are abilities and being satisfied with oneself[25].

The attitude toward smoking in this study was improved, as in many studies such as that of Duangkam and Sarayuthpitak[26]. The development of an activities program using a social support theory for changing the smoking behavior of undergraduate students and Larsen *et al.*[27] combine the cognitive bias modification with cognitive behavioral therapy in a smoking cessation intervention for adolescents. The targets were smoking adolescents in the

USA and the Netherlands. The randomized control trial used a study design[28]. The activities which increased negative attitudes toward cigarette smoking were promoting knowledge of cigarette harmfulness and empowering and counseling the subjects. These processes are correlated with the process of behavior change discussed by Prochaska *et al.*[12], who said that consciousness-raising supports a person to have more concern about the cause and impact of behavior that made the effectiveness of problematic behavior change. The behavior change was a result of these activities, which are consistent with the process of change. In order to gain consciousness, it encourages people to be more aware of their health consequences and behaviors that cause problems for the individual.

The difference of self-efficacy scores was significant between the intervention and control groups, consistent with many studies such as Stanton and Grimshaw's tobacco cessation interventions for youths[6] and others[7, 16, 29]. The program in this study was designed based on self-efficacy theory to control smoking behavior according to self-perception, through mastery experience, vicarious experience, verbal persuasion and emotional arousal. The study also explains a link between the IMB-stages of change models and these four elements[30].

The cigarette intake per day average was assessed, and by the end of the 24th week, there were six smokers (17.10 percent) in the control group (2.90 percent), a result that is similar to other studies[13, 22, 29]. The average number of cigarettes per day in the intervention group might have decreased because this study aimed to modify internal behaviors, like self-esteem, attitude toward smoking and perceived control over smoking. Although the study found that the number of cigarettes per day was not significantly different between the intervention and control groups, at 12 and 24 weeks, it was found that the experiment decreased the number of cigarettes per day perhaps because the intervention group changed their behavior.

The results of the cotinine levels under 200 ng/ml in the urine of students after finishing the cessation smoking program at 24 weeks shows that the percentage of non-smokers in the intervention group was 25 percent higher than the control group, which is similar to many studies[31–34]. A similar study by Guo *et al.*[33] revealed that at the end of the program, the percentage of non-smokers in that intervention group was 20.75 percent higher than the control group at the four-month follow-up. Therefore, the cessation of smoking in this study was effective at changing the behavior of male high school student smokers.

Conclusion

The smoking cessation program and the smoking behavior program helped male high school students to quit smoking. This program was based on the IMB skills and stages of change models affecting self-esteem, attitude, perception and practice regarding the control of smoking behaviors, and cotinine levels in the urine of male high school students.

Recommendations

(1) The program based on IMB skills and stages of change models should be promoted as one strategy to support smoke-free school policies among male high school students. This program could reduce another one-fourth of current smokers.

(2) This study has shown that the cessation program did not initially significantly impact the difference between cigarettes smoked per day between the intervention and control groups. However, after the time period was increased, the behaviors and perception toward smoking could change and have an impact on the smokers themselves. Therefore, schools and parents should pay more attention to children, so they can detect when the behavior is developing and potentially prevent it.

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Corresponding author
Chulaporn Sota can be contacted at: chusot@kku.ac.th