

Effectiveness of a Smoking Cessation Program for Adolescents

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Purpose. The purpose of this study was to test the effectiveness of a comprehensive smoking cessation program for Korean adolescents.

Method. The study design was quasi-experimental with one pre and three post-tests. The three posttests were done immediately after, three months later, and six months after the completion of the program. A total of 43 high school students who smoked participated in the study with 22 in the experimental group and 21 in the control group. The smoking cessation program consisted of 9 sessions with content on enhancement of self-efficacy, stress management, correction of distorted thoughts, consciousness raising, and assertiveness training. The study variables were urine cotinine levels, self-efficacy, stress, and stages of changed behavior.

Results. Urine cotinine levels significantly decreased in the experimental group after the program ($F=3.02$, $p=.06$) but significantly increased in the control group ($F=6.32$, $p=.004$). Self-efficacy and the degree of stress did not change in either group. The stages of smoking cessation behavior tended to change when compared with raw data for the experimental group. For most participants, the stages of change had been pre-contemplation and contemplation, but changed to action and maintenance stage among the experimental group.

Conclusion. The program was effective in smoking cessation and influencing stages of change but did not change psychosocial factors such as self-efficacy and stress. It is suggested a program should be developed to change psychosocial variables on a long-term basis. It is also desirable to involve peers and families of adolescents who smoke when planning programs to enhance social support.

Key Words: Smoking cessation program, Self-efficacy, Stress, Stages of Change

INTRODUCTION

Health behaviors formed during the adolescent period are crucially important for healthy adulthood. Cigarette smoking is the most important health problem for adolescents. It is well known that smoking can cause lung cancer, as well as cancers of the esophagus, bladder, kidney, larynx, and oral cavity. Eighty-five percent of lung cancer deaths and thirty percent of all cancer deaths are

attributable to smoking (Bolman & De Vries, 1998).

Korean adolescents smoking rate is the highest in the world. It is reported that twenty two percent of adolescents in high school and three percent of middle school students smoke (Korean Association of Smoking and Health, 2003). The age of smoking initiation is getting lower, and twenty-seven percent of middle school students have experienced cigarette smoking (Kim et al., 1999).

In spite of the severity of adolescent smoking prob-

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lems, most schools do not have classes for smoking cessation because education in Korea is oriented to college entrance. Most programs focused on only one session of teaching to deliver knowledge of the harmful effects of cigarettes; however, knowledge by itself is not enough to change smoking behavior. It was reported that knowledge about the harmful effects of cigarette smoking increased in the students who participated in smoking cessation classes but their smoking rate did not decrease (Kim, 1990). Thus, it is essential to educate them repeatedly to give rise to self motivation, and school is the most appropriate place for health education since community based programs for adolescents are not actively held in Korea.

In developing a smoking cessation program for adolescents, consideration should be given to gearing, to their needs, reflect cultural characteristics, consider psychosocial factors, and be held in multi-sessions (Lamkin, Davis, & Kamen, 1998). Individuals' self-motivation and self-efficacy were identified as the most effective variables in quitting smoking (Kim, 2000; Oh & Kim, 1996). Stress management also plays an important role in controlling smoking since stress identified as another component influencing adolescent smoking (Kim, 2000; Choi et al., 1995; Pederson et al., 1998).

Prochaska's stages of change construct grew out of a research program that focused on understanding how people change their behavior (Glanz et al., 1994). In using this construct in the development of a smoking cessation program, it is necessary to consider individuals' stages of change. Appropriate intervention in participants' stages of change could improve the effectiveness in smoking reduction efforts.

The purpose of this study was to develop a school-based comprehensive smoking cessation program which includes self-enhancement, stress management and stages of change for Korean adolescents and to test its effectiveness.

METHODS

Study Design

A nonequivalent quasi-experimental design with a pretest and three post-tests was used.

Sample

One convenient high school which agreed to participate in the study was selected.

A total of 51 first year students who had a somewhat serious smoking problem were referred to the group by their teachers. The students were divided into two groups. Thirty students participated in the experimental group and twenty one students in the control group. The 30 students who were assigned to experimental group were referred to the group by their teachers who wanted them to participate to the smoking cessation program or they were students who want to participate to the program themselves.

Instruments

- *Urine Cotinine*

The collected urine was analyzed by sending the sample to the Medicine-Science Research Laboratory in Seoul. Cotinine is a principle and residual metabolite of nicotine which remains in the body of habitual tobacco users.

- *Self-efficacy*

Self-efficacy was measured by the Self-efficacy/Temptation Inventory developed by Velicer et al.(1990). The inventory consists of 20 items on a 5-point Likert-type scale which asks the degree of resistance under temptation. Total scores range from 20 to 100 and a higher score indicates lower self-efficacy. Cronbach's alpha in the study was 0.85.

- *Stress*

The degree of stress was measured by The Stress Inventory developed by Lee (1995). There were 21 items on a 5-point Likert-type scale. Total scores range from 21 to 105 and a higher score indicated higher stress. Cronbach's alpha in the study was 0.87.

- *Stages of Change*

The University of Rhode Island Change Assessment (URICA) Inventory developed by McConaughy et al.(1983) was used to measure the stages of change in smoking cessation behavior. There are four stages, pre-contemplation, contemplation, action, and maintenance. The items in the URICA were scored on a 5-point Likert-type scale ranging from extremely negative to extremely positive. The participant's stage is the one with the highest score.

Data Collection

A pre-test prior to the program included completion of a self-administered questionnaire and a urine sample collection. A total of 30 participants were in the experimental group and 21 participants in the control group.

The post-test II was done 3 months after the program and post-test III was done 6 months after the program. The same procedure was done at all post-tests except collecting urine for the urine cotinine test at the second post-test because it would not have been cost effective. No follow-up treatments such as telephone call or e-mail contacts were provided after finishing the 9 sessions of program.

Human subjects' rights were respected. The purpose of the study and a brief summary of the program including confidentiality were explained, and the participants signed a consent form for agreement to participate in the study. They were also told that they had a right to drop the program if they wanted to during the program.

Of the 30 students in the experimental group, 22 students completed the program and eight students did not complete the program. The reasons for not completing the program included part-time jobs, absence from school, and going to a private academy.

The twenty-one students in the control group was maintained.

Data Analysis

Collected data were computerized according to score using SPSS/PC. The equivalency of the pretest and demographic characteristics of the two groups were tested using the X² or t-test. Repeated Measure ANOVA analysis was used to test the degree of change at each test point within the group. Bonferroni comparison analysis was performed to compare the difference between each test after correction of the p-value. To test the difference between groups, independent sample t-test analysis was used.

Group Procedure

The program was held twice a week from September to October, 2001. The group met once a week at the participants' classroom after school and each session ran for 40 to 50 minutes. The experimental group was divided into three small groups and three trained researcher led each group. The primary researcher trained the three group leaders who had specialty in psychiatric nursing and held at least a master's degree. Four sessions of education using a workbook were provided and 2 hours were required for each session. For self-evaluation a workbook, which was made by the researchers according to the session process, was given to each member.

The Smoking Cessation Program

A. Smoking cessation program development

1) Literature review

Various theories were used in developing the program such as a cognitive behavioral approach (Ouimette, Finney, & Moos, 1997), self-efficacy theory (Bandura, 1982), group psychoeducational approach (Yalom, 1975), and Stage of Change (Prochaska et al., 1994).

2) Inquiry to experts

In the development of the program, appropriate educational methods, essential content to be included in the program, and things to keep in mind were elicited from nursing professors and school nurses who had experience in conducting a drug prevention program with adolescents.

3) Test of content validity

Two psychiatric nursing professors and ten high school teachers reviewed the program to establish content validity. The program content were modified as they suggested.

4) Instruction methods

A workbook was made to distribute to each participant to use in each session. The workbook consisted of 9 sessions including a checklist for self-evaluation of daily smoking and a list of addresses of facilities which respond to smoking cessation.

B. The smoking cessation Program

Session 1: Orientation

The purpose of the program, meeting time and place were given. Researchers and each member introduced themselves including nicknames, hobbies, and reasons for being in the program. A written pledge was made to decrease the drop-out rate.

Session 2: Myself as a valuable person

This session was to raise self consciousness and self-esteem through self examination. The participants were encouraged to think about their past, present and future and write down their feelings and thoughts, including their strengths and weaknesses. After having enough time for self-reflection, each participant shared about himself with group members gave feedback by clapping hands.

Session 3: Correction of distorted thoughts

This session was to thoroughly explore the situation when they initiated cigarette smoking, advantages and disadvantages of smoking, the reason for smoking, alternatives to smoking, negative feelings toward self which make them smoke, and to look at their current coping methods. Negative feelings and thoughts about self were corrected by the practice of alternative positive thinking.

Session 4: Dramatic relief

A videotape regarding the life of lung cancer patients with a tracheostomy as a result of cigarette smoking was played. This was to show them the dangerous effects of smoking and to help them decide to quit smoking. After watching the tape, the participants share their feelings and thoughts.

Session 5: Consciousness raising

As a shocking method, the participants observe the dying process of a goldfish in water with nicotine. Goldfish were put in a beaker which has nicotine water and the time is checked until the goldfish die. After the experiment, students write their feelings in the workbook and express their shock, and this enhances the motivation to quit smoking.

Session 6: I can change

To enhance self-efficacy in this session a person is heard from who has quit smoking. Also group members if there is any one who has succeed in quitting smoking, give testimony. To encourage the members to express their difficulties and to renew their willingness to stop smoking each participant designates a sponsor among the group members. Also, to help in reducing and decreasing cigarette smoking, 'No Smoking' stickers were distributed.

Session 7: Assertiveness Training

To effectively cope with friends' pressure to smoke, assertiveness training and role playing was done. The participants were trained to say 'No' when their friends push and/or tempt them. After role playing, each participant expresses his feelings about when he forces or is

forced to smoke.

Session 8: Stress management

This session was to learn skills of stress management. The participants identify stressful situations and persons. They examined their current adaptive and maladaptive coping methods and discuss adaptive coping methods. Jacobson's progressive muscle relaxation was used to practice relaxation and the participants were encouraged to practice it regularly at home.

Session 9: Healthy Future

In the closing ceremony burning cigarettes was done as a symbol of permanent separation from cigarettes and the participants write a letter to self about deciding on a healthy future. All members expressed the good and bad things, what they had learned, and how their future will be. A certification is given to each member upon completion of the session.

RESULTS

Characteristics of the subjects

The equivalency of both groups was tested. There were no significant differences except 'smoking in family' between the experimental and control group (Table 2). Nine students (30.0%) in the experimental group, but only 2 students in the control group responded that they have a family member at home who smokes. Most of the students started smoking between 14 and 16 years old, 11 students (61.1%) in the experimental group and 10 students (47.6%) in the control group. Friends' pressure was the biggest reason for smoking in both groups, 10 students (62.5%) in the experimental group and 7 students (50.0%) in the control group. Thirteen students (61.9%) in the experimental group and 7 students (0.35%) in the control group responded that there was no possibility of smoking cessation.

Urine Cotinine

The urine cotinine level was equivalent in both groups at the pretest (Table 3). The mean differences among the three tests was not significant at a 0.05 level but was sig-

Table 1. Study Design

	Pretest	Treatment	Post-test I	Post-test II	Post-test III
Experimental Group (n = 22)	O1	X1	O2	O3	O4
Control Group (n = 21)	O1		O2	O3	O4

nificant at a 0.1 level in the experimental group ($F=3.01$, $p=.06$). This means that amount of smoking decreased after participating in the smoking cessation program for the experimental group. On the other hand, the mean differences were significant among the three tests at a 0.05 level in the control group ($F=6.32$, $p=.004$). Urine cotinine levels significantly increased in the control group which means that adolescents who did not participate in the program significantly increased their amount of smoking.

To identify the differences of each test point, the mean

difference of the two test points were compared by paired t-test (Table 4). The difference between the pretest and posttest III was significant, which means urine cotinine levels were significantly different in both groups six months after the smoking cessation program ($t=2.26$, $p=0.31$). The urine cotinine level was significantly lower in the experimental group at post-test III.

Self-efficacy

Self-efficacy did not significantly change after the pro-

Table 2. Characteristics of Students and Equivalency Test

Characteristics	Category	Exp (n=22) N(%)	Cont(n=21) N(%)	T/X ²	p
Enjoyment of school life	High	6 (28.6)	8 (38.1)	2.637	.451
	Fair	4 (19.0)	7 (33.3)		
	Little	8 (38.1)	4 (19.0)		
	Very low	3 (14.3)	2 (9.5)		
Academic performance	High	0 (0.0)	1 (4.8)	2.976	.226
	Middle	14 (46.7)	9 (42.9)		
	Low	7 (23.3)	11 (52.4)		
Smoking in the family	No	7 (23.2)	17 (89.5)	8.426	.004*
	Yes	9 (30.0)	2 (10.5)		
Reason for smoking	Friend's pressure	10 (62.5)	7 (50.0)	2.742	.602
	Curiosity	4 (25.0)	4 (28.6)		
	Masculinity	0 (0.0)	1 (7.1)		
	Advantage	1 (6.3)	0 (0.0)		
	Others	1 (6.3)	2 (14.3)		
Smoking initiation	Under 10 years of age	2 (11.2)	2 (9.6)	.460	.648
	11-13 years of age	3 (16.7)	6 (28.5)		
14-16 years of age	11 (61.1)	10 (47.6)	.184	.855	
Friends smoking	Less than 70%	4 (13.2)			3 (10.0)
	71-90%	1 (3.3)			3 (10.0)
	91-100%	9 (64.3)	9 (80.0)		
Possibility of smoking cessation	No	13 (61.9)	7 (35.0)	2.742	.602
	Middle	5 (23.8)	8 (40.0)		
	High	3 (14.3)	5 (25.0)		
Father's substance use	Smoking only	6 (28.6)	4 (19.0)	.184	.855
	Drinking only	5 (23.8)	1 (4.8)		
	Use of neither	4 (19.0)	2 (9.5)		
	Use of both	6 (28.6)	14 (66.7)		
Mother's substance use	Smoking only	0 (0.0)	0 (0.0)	2.970	.227
	Drinking only	6 (28.6)	6 (30.0)		
	Use of neither	15 (71.4)	13 (65.0)		
	Use of both	0 (0.0)	1 (5.0)		

* $p < .05$

Table 3. Urine Cotinine Level

Group	Pretest	Post-testI	Post-testIII	F	p
	M±SD	M±SD	M±SD		
Experimental (n=22)	215.41±394.27	84.15±139.45	69.42±75.83	3.02	.06*
Control (n=21)	37.15±27.63	50.16±39.87	79.60±61.06	6.32	.004**

* $p < .1$ ** $p < .05$

gram in the experimental ($F=.523, p=.668$) or control group ($F=1.243, p=.303$) at each test point. Table 5 shows the results for self-efficacy.

Stress

The degree of stress did not significantly change after the program in the experimental ($F=.404, p=.751$) or control group ($F=1.228, p=.309$). The results for stress are shown in Table 6.

Stages of change of smoking cessation behavior

Raw data was used in interpreting the result because statistical analysis could not be used due to the small sample size. There were two participants in the action stage in the experimental group and none in the control

group at the pretest. Action and maintenance stages increased in both groups after the program. The participants in the experimental group showed more change compared to the control group. Only 2 participants (10.0%) in the experimental group were in the action stage at the pretest but there were 6 participants (27.3%) at posttest I. Eight participants (38.1%) were in the action stage and five (23.8%) were in the maintenance stage after completion of the program. From the results, it can be inferred that the degree of change was prominent 6 months after the program (Table 7).

DISCUSSION

Adolescents have more dependency on cigarettes than

Table 4. Differences of Urine Cotinine Levels between Test Points

	Experimental Group (n=22)	Control Group (n=21)	t	p
Pretest - Posttest I(M±SD)	129.19±94326.14	-13.01±46.99	1.98	.061
Pretest - Posttest III (M±SD)	144.22±370	-44.62±51.17	2.26	.031*
PosttestI - PosttestIII (M±SD)	14.73±132.92	-26.93±71.86	1.25	.220

*p<.05

Table 5. Degree of Self-efficacy at Each Test Point

Group	Pre	Post I	Post II	Post III	F	p
	M±SD	M±SD	M±SD	M±SD		
Exp (n=22)	70.10±13.20	66.05±12.14	67.90±13.06	66.57±11.43	.523	.668
Con(n=21)	71.86±20.23	61.86±19.10	68.53±15.61	69.48±16.84	1.243	.303
t	-.334	.862	-.136	-.699		
p	.740	.394	.892	.489		

Table 6. Degree of Stress

Group	Pre	Post I	Post II	Post III	F	p
	M±SD	M±SD	M±SD	M±SD		
Exp (n=22)	58.65±17.33	60.23±03.54	59.55±13.66	62.90±15.30	.404	.751
Con (n=21)	57.33±12.82	61.14±15.20	56.21±13.65	54.86±15.13	1.228	.309
t	.278	-.209	.763	1.775		
p	.783	.836	.450	.084		

Table 7. Stages of Change for Smoking Cessation Behavior

	Pre		PosttestI		PosttestII		PosttestIII	
	N (%)		N (%)		N (%)		N (%)	
	Exp	Con	Exp	Con	Exp	Con	Exp	Con
Precontemplation	8 (40.0)	10 (47.6)	5 (22.7)	9 (42.9)	7 (35.0)	5 (26.3)	2 (9.5)	7 (33.3)
Contemplation	10 (50.0)	11 (52.4)	10 (45.5)	7 (33.3)	6 (30.0)	8 (42.1)	6 (28.6)	10 (47.6)
Action	2 (10.0)		6 (27.3)	3 (14.3)	6 (30.0)	2 (10.5)	8 (38.1)	4 (19.0)
Maintenance			1 (4.5)	2 (9.5)	1 (5.0)	4 (21.1)	5 (23.8)	

adults (Rojas, 1998). Thus smoking cessation is more difficult for them (Crump, Lillie-Blanton, & Anthony, 1997). This study was conducted to test the effectiveness of a comprehensive program for smoking cessation for adolescents.

The urine cotinine level is considered the most useful biological factor in testing the effectiveness of smoking cessation. At the pretest, most of the participants in the experimental group responded "It is not possible to stop smoking." However, urine cotinine levels decreased in the experimental group after six months, but significantly increased in the control group at that time. This means that the smoking cessation program was effective in decreasing cigarette smoking. This finding is consistent with Park's study (2004) which 55.3% stopped smoking six months after completing the five day smoking cessation program for high school students. Although follow-up treatments such as telephone counseling or e-mailing were not provided in this study, it is necessary to provide a follow-up care as it continues the effectiveness of the smoking cessation program (Lee & Ryu, 2003).

Regarding psychosocial factors such as self-efficacy and stress, the results of prior studies did not show consistency. Matheny and Weatherman's study (1998) identified adolescents' self-efficacy as increased after a smoking cessation program. De Vries and Backbier (1994) also reported that each individual's will power, self-motivation, and self-efficacy are important to stop smoking. In that study, 82% of those who had stopped smoking answered that these items were important. On the other hand, researchers said that psychological factors have less of an effect on male adolescents smoking cessation (Rojas et al., 1998). Lee (1992) also reported that there was no psychosocial difference between adolescents who smoke and those who do not. In this study, self-efficacy and stress did not change after the program. It can be inferred that adolescents smoking cessation can be influenced by peer group, family and school regulations on not smoking. It is also thought that it is difficult to change psychosocial factors in a short period of time. Adolescents do not see smoking behavior as a serious problem to their health (Kim & Kim, 1996) and they think that it is okay to smoke if it does not bother others (Seo et al., 1998). These facts show the difficulties of smoking cessation in adolescents, thus they need long-term and repeated sessions which deal intensively with psychosocial factors.

Due to the small sample size change of smoking cessa-

tion behavior could not be tested statistically. Thus the tendency of change was determined by using number and percent. Most of the participants in the experimental group were in the precontemplation or contemplation stage before the program. They markedly changed to action and maintenance stages. This means the program was effective in changing the participants' smoking cessation behavior and the most effective time was six months after the program. These results are consistent with Kim's study (1999) which identified behavior change after the smoking cessation program. Kwon (2003) also reported that soldiers who smoked and who were in the precontemplation stage changed to contemplation and preparation stage after cognitive therapy and use nicotine patch. Sound decisions involve careful consideration of all pertinent information for comparative gains and losses (Grimley et al., 1993). The study participants' decision to stop smoking was consideration of the advantages of changing their behavior.

As many researchers agree about the benefits of small group activity small group discussion methodology was used. Small group activity helps the members to expand their self-awareness, giving validity to their thoughts. Thus it helps in self-establishment and ego-development (Kim, 1997; Hurst et al., 1997). However, small group discussions have not generally been used in the health education area; education in Korea usually focused on one-way lectures from teachers, so students seldom expressed their feelings and thoughts. This study showed that it is desirable to develop effective ways for adolescents to discuss their feelings, concerns and thoughts.

CONCLUSION

This study was done to develop and test the effectiveness of a school based smoking cessation program for adolescents in Korea. The program consisted of 9 sessions using the cognitive behavioral theory, self-efficacy theory, stress management theory and psychosocial approach. This comprehensive program was effective in decreasing urine cotinine levels and in changing smoking cessation behaviors but not in changing self-efficacy and degree of stress.

Urine cotinine levels significantly decreased in the experimental group. Urine cotinine levels significantly decreased at posttest III when compared to the pretest. Thus the smoking cessation program was effective in decreasing adolescent smoking and the effects was highest

6 months after program completion.

Self-efficacy and degree of stress did not change significantly after the program in either group. This means that the program was not effective to change psychosocial variables in adolescents who smoke.

The stages of change of smoking cessation behavior could not be tested statistically due to the limitation of the sample size. From the raw data, it can be inferred that the participants' smoking cessation behavior changed from pre-contemplation and contemplation stages to action and maintenance stages.

In considering the results of the study, it is suggested further study be conducted in which a larger sample of adolescents who smoke is used to focus on changing the psychosocial variables and to consider a more appropriate educational method for Korean adolescents. It is also suggested that the program involve social support such as friends, families, and teachers of the adolescents' in the program.

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