# Effects of a Tobacco Prevention Education Program on Adolescents' Knowledge of and Attitude Toward Smoking

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***Purpose.*** To evaluate the effectiveness of a smoking prevention program on the perception of and attitudes toward smoking in adolescents.

***Methods.*** First graders of eight randomly selected junior high schools in Taichung were recruited into two groups. A total of 412 students from four schools served as the experimental group and 440 students from the other four schools comprised the control group. All of the students received an educational brochure after completing a structured pre-intervention questionnaire to measure their knowledge of and attitudes toward smoking. After two weeks, an intervention program consisting of a two-hour lecture was provided to the experimental group only; then, each group completed the same post-intervention questionnaire. A total of 778 students completed the pre- and post-intervention questionnaires.

***Results.*** The results indicated that adolescents' knowledge of and attitudes toward smoking in the experimental group (0.18 > 0.12, $p = 0.039$; 0.25 > 0.17, $p < 0.001$) improved significantly after the intervention program. Furthermore, after controlling for possible confounding factors such as gender, family structure, smoking experience, and baseline knowledge and attitudes, adolescents' knowledge of and attitudes toward smoking in the experimental group still improved significantly more than those in the control group ($\beta = 1.203$, $p < 0.001$; $\beta = 1.21$, $p = 0.027$).

***Conclusions.*** The tobacco prevention education program improved adolescents' knowledge of and attitudes toward the hazards of cigarette smoking. **( Mid Taiwan J Med 2005;10:171-80 )**

**Key words**

adolescent, attitudes against smoking, intervention, knowledge of tobacco hazard, tobacco prevention education

## INTRODUCTION

Cigarette smoking is the major preventive cause of death worldwide [1,2]. According to the World Health Organization (WHO), there are about three million smoking-related deaths each year [3]. It is estimated that there will be ten million deaths each year from 2020 to 2030. In developing countries, 70% of deaths are tobacco-related; as a result, smoking prevention is one of the important missions of the WHO [3,4].

Tobacco use at a young age may cause increases in health care costs. According to the Centers for Disease Control and Prevention (CDC) in the United States, the percentage of

Received : 18 January 2005. Revised : 11 April 2005.
Accepted : 6 September 2005.

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youth who smoke increased from 27.5% in 1991 to 42.7% in 1997 [5]. Previous studies concluded that the prevalence rates of smoking among 12 to 19-year-olds ranged from 19.0% to 42.8%, and that smoking among males was higher than among females [6-8]. Lu and Yen conducted a three-year study to investigate Taiwanese teenagers' initiation to tobacco use and pointed out that the percentage of junior high school students' tobacco use increased from 6% in the first year to 20% in the second year. The period from the eighth to the ninth grade was the critical time for teenagers to try their first cigarette [9].

The WHO has stated that 80% of smokers begin smoking before the age of 18 [10]. A study by Kao and Yen indicated that many Taiwanese first experiment with cigarette smoking from the fifth to eighth grade; furthermore, they stated that peer pressure contributed to the continuance of tobacco use [11]. Previous studies have further indicated many factors which affect teenagers' tobacco use, such as gender, parents and other family members who smoke, rebellion against authority, school environment, tobacco advertising and promotion, personal characteristics, and lack of information about the hazards associated with smoking [12,13].

Researchers have indicated that school-based tobacco prevention programs can be an effective means of preventing tobacco use among youth [2]. In this study, a tobacco prevention education program was conducted to increase students' knowledge of tobacco hazards and to decrease the number of students who smoke.

## SUBJECTS AND METHODS

### Subjects

We randomly selected 8 of the 34 junior high schools in Taichung for this study. Among them, through purposive sampling, 4 schools were assigned to the experimental group and the other 4 schools served as the control group. Three seventh-grade classes were chosen to participate in this study. Students were randomly selected for the experimental group (n = 412) and the control group (n = 440). The tobacco prevention education program was implemented and structured questionnaires for pre- and post-intervention were administered between September and October 2004. A total of 369 (experimental group (90%)) and 409 (control group (93%)) effective questionnaires were collected. Homogeneity between the experimental and control groups in number of classes, students, and proportion of gender was analyzed by *t* test. The results showed high homogeneity in these aspects ($p > 0.05$).

### Design

This study was a quasi-experimental design. Both experimental and control groups completed pre-intervention questionnaires and each student received a smoking prevention brochure. Only the experimental group participated in the intervention program. A celebrity spokesman for tobacco prevention was invited to the experimental group to promote and lecture on the importance of tobacco prevention. After the 2-hour education program, a pre-intervention questionnaire was administered to the experimental group. The control group only received the brochure on hazards of smoking. After two weeks, the post- intervention questionnaire was administered.

### Instruments

A structured questionnaire was employed to evaluate the effectiveness of the tobacco prevention education program. It was modified and based on a questionnaire developed in a previous study [11]. A total of 65 questions were included in the questionnaire; there were 15 questions on personal characteristics and tobacco use, 20 true or false questions on knowledge of tobacco hazards, 19 five-point Likert scale questions on attitudes against smoking, 5 eleven-point Likert scale questions on ability to refuse smoking and 6 questions on willingness to smoke. On the 20 true or false questions regarding knowledge of tobacco hazard, students were given 1 point for answering correctly, and 0 points for answering incorrectly. On the Likert scale questions regarding attitudes against smoking, the higher the scores students got, the more positive attitudes students had.

**Table 1. Descriptive statistics of sample characteristics**

| Variables | Control group (N = 409) n (%) | Experimental group (N = 369) n (%) | *p* |
|---|---|---|---|
| Gender | | | 0.528 |
| Girl | 211 (51.6) | 182 (49.3) | |
| Boy | 198 (48.4) | 187 (50.7) | |
| Allowance | | | 0.204 |
| None | 133 (32.5) | 126 (34.2) | |
| 500 NTD and below | 211 (51.6) | 195 (52.9) | |
| 501 −1000 NT$ | 47 (11.5) | 33 (8.9) | |
| 1001 −2000 NT$ | 9 (2.2) | 9 (2.4) | |
| 2001 −4000 NT$ | 9 (2.2) | 3 (0.8) | |
| 4000 NTD and above | 0 (0.0) | 3 (0.8) | |
| Family type | | | 0.307 |
| Two-parent family | 348 (85.1) | 304 (82.4) | |
| Single-parent family | 61 (14.9) | 65 (17.6) | |
| Father's education level | | | 0.049 |
| Junior high and below | 117 (28.6) | 88 (23.9) | |
| Senior high | 161 (39.4) | 156 (42.3) | |
| College | 43 (10.5) | 53 (14.4) | |
| University and above | 68 (16.6) | 65 (17.6) | |
| I don't know | 20 (4.9) | 7 (1.9) | |
| Mother's education level | | | 0.066 |
| Junior high and below | 131 (32.0) | 98 (26.6) | |
| Senior high | 170 (41.6) | 165 (44.7) | |
| College | 40 (9.8) | 53 (14.4) | |
| University and above | 53 (13.0) | 47 (12.7) | |
| I don't know | 15 (3.7) | 6 (1.6) | |
| Father's occupation | | | 0.684 |
| Public servant | 41 (10.0) | 46 (12.5) | |
| Business | 93 (22.7) | 92 (24.9) | |
| Labor | 123 (30.1) | 102 (27.6) | |
| Service/self-employed | 111 (27.1) | 100 (27.1) | |
| Housewife/unemployed | 21 (5.1) | 13 (3.5) | |
| I don't know | 20 (4.9) | 16 (4.3) | |
| Mother's occupation | | | 0.064 |
| Public servant | 42 (10.3) | 37 (10.0) | |
| Business | 45 (11.0) | 60 (16.3) | |
| Labor | 68 (16.6) | 40 (10.8) | |
| Service/self-employed | 99 (24.2) | 101 (27.4) | |
| Housewife/unemployed | 140 (34.2) | 122 (33.1) | |
| I don't know | 15 (3.7) | 9 (2.4) | |

Experts on public healthcare were invited to examine the validity of the questionnaire. The questionnaire was administered to 20 first-year junior high school students as a pilot test. Pre- and post-intervention questionnaires were administered and collected by the same interviewers. The knowledge of tobacco hazards was analyzed by the Kuder-Richardson formula 20 (0.81); attitudes against smoking and ability to refuse smoking were analyzed by Cronbach α (0.66 and 0.87) [14]. These values indicated high reliability of the instruments used in this study.

### Data collection and data analysis

In order to evaluate the effectiveness of the tobacco prevention education program, we evaluated knowledge about tobacco hazards, anti-smoking attitudes, and ability to refuse smoking. Chi-square test was conducted to compare students' personal characteristics and tobacco use; the *t* test was employed to determine whether there was a significant difference between the

**Table 2. Comparison of tobacco use in experimental and control groups**

| Variables | Control (N = 409) n (%) | Experimental (N = 369) n (%) | *p* |
|---|---|---|---|
| Parental smoking | | | 0.405 |
| None | 160 (39.1) | 135 (36.6) | |
| Father | 194 (47.4) | 175 (47.4) | |
| Mother | 3 (0.7) | 4 (1.1) | |
| Both | 31 (7.6) | 24 (6.5) | |
| Quit | 21 (5.1) | 31 (8.4) | |
| Willingness to smoke | | | 0.063 |
| Strong | 17 (4.2) | 30 (8.1) | |
| Moderate | 35 (8.6) | 33 (8.9) | |
| Weak | 357 (87.3) | 306 (82.9) | |
| Experience of accepting tobacco offer | | | 0.084 |
| No | 364 (89.0) | 313 (84.8) | |
| Yes | 45 (11.0) | 56 (15.2) | |
| Person offering tobacco* (multiple-choice) | | | - |
| Classmates | 13 (28.9) | 7 (12.5) | |
| Friends | 13 (28.9) | 21 (37.5) | |
| Family members | 12 (26.7) | 27 (48.2) | |
| Others | 9 (20.0) | 3 (5.4) | |
| Response to tobacco offered* | | | 0.081 |
| Refuse | 29 (64.4) | 28 (50.0) | |
| Accept | 16 (35.6) | 28 (50.0) | |
| Experiences of tobacco use | | | 0.022 |
| Never | 386 (94.4) | 331 (89.7) | |
| Tried but quit | 22 (5.4) | 32 (8.7) | |
| Once in a while | 1 (0.2) | 6 (1.6) | |
| Key person influencing smoking† | | | 0.003‡ |
| Family | 8 (34.8) | 20 (52.6) | |
| Relatives | 8 (34.8) | 5 (13.2) | |
| Friends and classmates | 5 (21.7) | 10 (26.3) | |
| Myself | 2 (8.7) | 3 (7.9) | |

*Responses from students who experienced tobacco offer. †Responses from students who experienced tobacco use; ‡Fisher exact test.

experimental and control groups in attitudes against smoking and ability to refuse smoking. Personal characteristics and students' tobacco use served as independent variables. Stepwise multiple regression analyzed the factors associated with changes in knowledge about tobacco hazard and attitudes toward smoking.

## RESULTS

A total of 778 questionnaires were collected from the control group (n = 409) and the experimental group (n = 369) (Table 1). Approximately 50% of the students in the experimental and control groups were given monthly allowances of less than NT 500. More than 80% of the students were from two-parent families. Table 1 shows that most of their parents' education levels were senior high school; however, the education level of students' fathers in the control group was lower than that in the experimental group ($p$ = 0.049). The prevalence of smoking among students in both groups was very similar (Table 2). In these two groups, 47.4% of students reported that their fathers smoke; less than 1% of them reported that both parents smoke. More than 80% (87.3% in the control group and 82.9% in the experimental group) of the students expressed that they did not want to try smoking. Eleven percent of the students in the control group and 15.2% in the experimental group reported that they had been offered cigarettes. The prevalence rate of smoking in the

**Table 3. Bivariate analysis of knowledge of tobacco hazard, anti-smoking attitudes, and ability to refuse smoking**

| Variables | Control group | | | | Experimental group | | | | Difference between two groups (pre-test) | Difference between two groups (improvement) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pre-test Mean (SD) | Post-test Mean (SD) | Improvement Mean (SD) | $p^{\S}$ | Pre-test Mean (SD) | Post-test Mean (SD) | Improvement Mean (SD) | $p^{\S}$ | $p^{\text{II}}$ | $p^{\P}$ |
| 1* | 0.54 (0.15) | 0.66 (0.14) | 0.12 (0.15) | < 0.001 | 0.54 (0.15) | 0.72 (0.16) | 0.18 (0.16) | < 0.001 | 0.301 | 0.039 |
| 2† | 4.20 (0.50) | 4.38 (0.46) | 0.17 (0.45) | < 0.001 | 4.16 (0.52) | 4.41 (0.53) | 0.25 (0.50) | < 0.001 | 0.695 | < 0.001 |
| 3‡ | 9.18 (1.60) | 9.34 (1.39) | 0.17 (1.20) | 0.005 | 8.94 (1.95) | 9.30 (1.60) | 0.36 (1.67) | < 0.001 | 0.064 | 0.068 |

*Knowledge of tobacco hazards. †Attitudes against smoking. ‡Ability to refuse smoking. §$p$ for within group pre- and post- $t$ test. $^{\text{II}}p$ for between groups pre- $t$ test. ¶$p$ for between groups post- $t$ test.

**Table 4. Bivariate analysis of willingness to smoke**

| Variables | Control group (N = 409) n (%) | Experimental group (N = 369) n (%) | $p$ |
|---|---|---|---|
| After the program, does your dislike of tobacco use be reinforced? | | | 0.998 |
| No | 9 (2.2) | 8 (2.2) | |
| Yes | 363 (88.8) | 328 (88.9) | |
| No difference | 37 (9.1) | 33 (8.9) | |
| After the program, will you refuse smoking? | | | 0.302 |
| No | 9 (2.2) | 15 (4.1) | |
| Yes | 382 (93.4) | 336 (91.1) | |
| No difference | 18 (4.4) | 18 (4.9) | |
| After the program, will your desire of smoking decrease? | | | 0.770 |
| No | 14 (3.4) | 16 (4.3) | |
| Yes | 367 (89.7) | 326 (88.4) | |
| No difference | 28 (6.9) | 27 (7.3) | |
| After the program, will you stop your family members or friends from smoking? | | | 0.144 |
| No | 14 (3.4) | 32 (8.7) | |
| Yes | 367 (89.7) | 305 (82.7) | |
| No difference | 28 (6.9) | 32 (8.7) | |
| After the program, will you stop others from smoking if they smoke in a smoke-free place? | | | 0.014 |
| No | 45 (11.0) | 22 (6.0) | |
| Yes | 315 (77.0) | 301 (81.6) | |
| No difference | 49 (12.0) | 46 (12.5) | |
| Do you like this tobacco prevention education program? | | | 0.007 |
| No | 13 (3.2) | 7 (1.9) | |
| Yes | 305 (74.6) | 309 (83.7) | |
| No difference | 91 (22.3) | 53 (14.4) | |

Responses from the experimental group are related to the tobacco prevention education program; responses from the control group are related to the booklet of tobacco prevention.

experimental group was significantly higher than that in the control group (10.3% > 5.6%; $p$ = 0.022). Among the students who tried smoking, more students in the experimental group believed that they were mainly influenced by family members compared with those in the control group (52.6% > 34.8%; $p$ = 0.003).

Significant differences in knowledge about tobacco hazards, attitudes against smoking, and ability to refuse smoking existed on the pre-

**Table 5. Results of the stepwise multiple regression analysis on knowledge of tobacco hazard**

| Variables | Estimate | Standardized estimate | Standard error | *p* |
|---|---|---|---|---|
| Intercept | 8.834 | - | 0.309 | < 0.001 |
| Tobacco prevention education program | | | | |
| Control group | referent | referent | | |
| Experimental group | 1.203 | 0.189 | 0.191 | < 0.001 |
| Gender | | | | |
| Girl | referent | referent | | |
| Boy | −0.723 | −0.114 | 0.193 | < 0.001 |
| Pre-test | −11.303 | −0.530 | 0.645 | < 0.001 |

$R^2 = 0.31$; $p < 0.01$.

**Table 6. Results of the stepwise multiple regression analysis on attitudes against smoking**

| Variables | Estimate | Standardized estimate | Standard error | *p* |
|---|---|---|---|---|
| Intercept | 42.316 | - | 2.379 | < 0.001 |
| Tobacco prevention education program | | | | |
| Control group | referent | referent | | |
| Experimental group | 1.21 | 0.067 | 0.549 | 0.027 |
| Family type | | | | |
| Two-parent family | referent | referent | | |
| Single-parent family | −1.711 | −0.070 | 0.747 | 0.022 |
| Experiences of tobacco use | | | | |
| Never | referent | referent | | |
| Tried but quit | −2.676 | −0.075 | 1.090 | 0.014 |
| Once in a while | −10.866 | −0.113 | 2.955 | < 0.001 |
| Pre-test of attitudes against smoking | −10.253 | −0.575 | 0.575 | < 0.001 |
| Pre-test of knowledge of tobacco hazards | 8.423 | 0.139 | 1.921 | < 0.001 |

$R^2 = 0.30$; $p < 0.01$.

intervention questionnaire between the experimental and control groups (Table 3). However, both groups showed significant differences in knowledge of tobacco hazards, attitudes against smoking, and ability to refuse smoking when the pre- and post-intervention scores were compared. Furthermore, in the experimental group, students scored significantly higher on knowledge of tobacco hazards and anti-smoking attitudes than those in the control group. The differences in mean scores were 0.18 > 0.12 ($p = 0.039$) and 0.25 > 0.17 ($p < 0.001$). As seen in Table 4, the percentage of students who were willing to stop people from smoking in the experimental group (81.6%) was significantly higher than that in the control group (81.6% > 77.0%, $p = 0.014$). The percentage of students who liked the tobacco prevention education program in the experimental group (83.7%) was significantly higher than the percentage of students who liked the tobacco prevention booklet in the control group (83.7% > 74.6%, $p = 0.007$).

As seen in Table 5, the results of stepwise multiple regression analysis showed that the improvement in scores on the knowledge of tobacco hazards which students received in the experimental group was 1.20 points higher than that in the control group. The improvement in scores on the knowledge of tobacco hazard which boys received was 0.72 points lower than that of girls. However, the more knowledge students had of tobacco hazard on the pre-test, the less improvement they showed on the post-intervention. In Table 6, the results of stepwise multiple regression analysis showed that students' scores on attitudes against smoking in the experimental group improved significantly more than those in the control group ($\beta = 1.21$, $p < 0.001$). The attitudes against smoking among students in a single parent family were

significantly lower than those in a two-parent family; the attitudes against smoking among students who had tried tobacco or smoked once in a while were significantly lower than those who had never tried. The more positive anti-smoking attitudes students had on the pre-intervention, the less improvement they showed on the post-intervention. The higher the scores students had on knowledge of tobacco hazard on the pre-intervention questionnaire, the more they improved on attitudes against smoking on the post intervention questionnaire.

## DISCUSSION

The results showed that nearly 7% of the 778 junior high school students of this study had smoked cigarettes, and 0.9% of them smoked on a regular basis. This result was much lower than that reported in previous studies (6% to 28.6%) [9]. Studies have also suggested that, in order to decrease the rate of adolescent smoking, a tobacco prevention education should be implemented and promoted before students' initiation of tobacco use to convey the knowledge of tobacco hazards and form positive attitudes against smoking. Our results showed that, after the implementation of the tobacco prevention education program, 89.1% of the students expressed that they had less desire to smoke and 92.3% of them became more willing to stop smoking. A long-term investigation on the effectiveness of tobacco prevention education program is suggested.

History of tobacco use and family members who smoke were the important factors which affected youth smoking. More than 50% of the students reported that there is at least one family member who smokes. The top three sources from whom students were offered tobacco were family members (38.6%), friends (33.7%), and classmates (19.8%); additionally, students expressed that family members (45.9%) and friends or classmates (24.6%) were the two main sources which induced their smoking. This result echoed the findings of previous research which found that parental and peer smoking were the main factors associated with youth smoking. Students expressed higher willingness to smoke when both of their parents smoke [11]. As a result, it was concluded that smoking among youth is highly correlated with their family background. Additionally, we found that 43% of students would accept offers to smoke because of peer pressure and a lack of self-discipline. The sense of belonging to a peer group has a great influence on youth smoking [13]. Wolfson et al pointed out that 68.80% of young smokers had offered tobacco to other teenagers; this indicated the peer pressure was highly correlated with smoking among young people [15]. Hence, in order to prevent youth smoking, both the knowledge of tobacco hazards and ability to refuse smoking should be reinforced.

Previous studies have indicated that mass communication had a great influence on adolescent smoking. Youth are easily influenced by their favorite idols who smoke and a positive correlation between a popular idol's smoking and adolescent smoking has been reported [16]. Therefore, in order to boost the effectiveness of tobacco prevention programs, celebrities were invited to discuss the hazards of smoking. The results of this study showed that students' post-intervention scores on the knowledge of tobacco hazard, anti-smoking attitudes, and ability to refuse smoking were significantly higher than those in the pre-interventions. This indicated that both the tobacco prevention brochures and the implementation of a tobacco prevention program were effective at decreasing youth smoking.

Stepwise multiple regression analysis of the knowledge of tobacco hazards showed that there was a positive correlation between the intervention program and improvement in the knowledge of tobacco hazard ($p < 0.05$). This result confirmed the results of previous studies [11,17]. It is suggested that the prevention program should be implemented for at least two years to observe the effectiveness of the program [18]. In 1994, the CDC in the United States suggested that tobacco prevention programs should extend from kindergarten to senior high school [19]. Therefore, the implementation of a long-term tobacco prevention education program

in Taiwan will be necessary to decrease smoking among young people.

We found that there was a positive correlation between students' personal characteristics and their knowledge of tobacco hazards and anti-smoking attitudes. Boys scored significantly lower on the knowledge of tobacco hazards than girls; also, students from single-parent homes scored significantly lower on anti-smoking attitudes than others. Previous studies have pointed out that the smoking rate among boys is higher than that among girls [7,11]; this implies a positive relationship between knowledge of tobacco hazards, negative attitude toward smoking, and smoking behavior. In addition, a high percentage of students from single-parent or separated/devoiced families smoke [12,20]. Distefan et al also pointed out that good parental relationships keep teenagers from smoking [21]; on the other hand, inadequate parental supervision might be the cause of teenagers' deviant behavior and smoking [22]. However, little research has been done on the relationship between family types and teenagers' attitudes toward smoking.

Stepwise multiple regression analysis revealed that the pre-test scores on the knowledge of tobacco hazard and anti-smoking attitudes negatively correlated with their improvements. The short-term implementation of the tobacco prevention education program had limited influence on students' knowledge of the hazards of tobacco and anti-smoking attitudes. Most adolescent smoking is caused by peer pressure and curiosity. Therefore, the influence of peer pressure could be wisely employed to improve students' smoking behavior. After the intervention, the higher scores students had on the knowledge of tobacco hazards on the pre-test, the more they improved on attitudes against smoking. This confirmed the results found in a previous study [23]. However, the knowledge of tobacco hazards may not directly affect the behavior of smoking. Hence, in order to decrease the rate of smoking among teenagers, it is more important to change their attitudes toward smoking and to improve their knowledge about the hazards of smoking.

After controlling for the confounding factors in this study, the results indicated that, among the three indicators i.e., knowledge of tobacco hazards, attitudes against smoking, and ability to refuse smoking, only the knowledge of tobacco hazards and attitudes against smoking improved significantly. There were several limitations in this study. First, it was a quasi-experimental design. The personal characteristics in the experimental and control groups were highly homogeneous but the purposive sampling may have caused selection bias and limited the external validity. Second, the investigation time was short and only the short-term effects could be observed.

Based on the results of this study, we suggest the following: 1) Tobacco prevention programs should be implemented in junior high schools to reinforce students' knowledge of tobacco hazards. 2) The invitation of celebrity spokesmen and giving gifts for answering correctly are suggested in the future implementation of tobacco prevention education programs. 3) Counseling and communication needs to be reinforced for students who smoke or whose family members smoke.

## ACKNOWLEDGMENT

Sincere appreciation is owed to the Public Health Bureau, Taichung City, for providing financial support for this investigation.

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# 菸害防制教育活動對青少年菸害防制知識與態度之影響

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**目的**　對吸菸嘗試階段的青少年，透過菸害教育介入活動，加強青少年對菸害的認知，分析影響拒菸態度之改變。

**方法**　本研究自台中市所有國中隨機取樣八所一年級學生爲研究對象，經學校同意後選取四所國中爲菸害教育介入活動之實驗組，共412人；另四所同質性國中爲對照組，共440人。兩組分別進行前測，再提供「菸害小常識手冊」自修。兩週後爲實驗組提供進一步兩小時菸害教育課程及有獎徵答，並針對兩組學生舉行後測，總共有778位學生完成所有問卷調查。

**結果**　在菸害知識與拒菸態度之改善上，實驗組比對照組有較多的改善(0.18 > 0.12，$p$ = 0.039；0.25 > 0.17，$p$ < 0.001)，顯示菸害教育介入活動有顯著效果。由逐步複迴歸分析結果發現，在控制相關干擾因素例如性別、家庭結構、父母吸菸行爲、吸菸經驗、前測菸害知識、前測拒菸態度等，實驗組學生菸害知識及拒菸態度增加程度顯著高於對照組學生(β = 1.203，$p$ < 0.001；β = 1.21，$p$ = 0.027)。

**結論**　舉辦菸害教育介入活動對於促進青少年在菸害相關知識及拒菸態度的改善程度上具有相當的成效。（**中台灣醫誌 2005;10:171-80**）

**關鍵詞**

青少年，拒菸態度，介入活動，菸害知識，菸害教育

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收文日期：2005年1月18日　　修改日期：2005年4月11日

接受日期：2005年9月6日