RESEARCH ARTICLE

Effects of an Anti-Smoking Program to Prevent Lung Cancer among Urban Aboriginals in Taiwan

Mei-Hsiang Lin[1], Sheu-Jen Huang[2&*], Whei-Mei Jean Shih[1], Pao-Yu Wang[3], Li-Hui Lin[4], Hsiu-Chin Hsu[1&*]

Abstract

Background and Purpose: Indigenous people who leave their hometowns and move to the city to earn a living became urban aboriginals. During the process of adapting to urban living situations, they may use various coping strategies such as smoking to overcome their stress. Therefore, it is crucial to provide health education including smoking prevention, increasing knowledge regarding of tobacco hazard, self-efficacy of anti-smoking, and adjusting smoking behavior so as to empower their anti-smoking motivation to prevent lung cancer. The purpose of this study was to explore the effectiveness of an anti-smoking program on urban aboriginals in Taiwan. Methods: A quasi-experimental study design with purposeful sampling was employed. A total of 125 aboriginal subjects were recruited from two local churches at Shu Lin area in northern Taiwan. Subjects were divided into an experimental group (n =64) and a control group (n = 61). Both took pre-tests in order to set baseline values, and only the experimental group participated for 3-weeks in the anti-smoking program classes. Both groups took post-tests immediately after the intervention in order to evaluate the immediate effects of the teaching program, and a follow-up test was conducted four weeks after the intervention. Data were analyzed using descriptive statistics, one-way ANCOVA, and repeat measure ANCOVA. Results: After controlling for confounding variables, the results showed that there were statistically significant differences in the self-efficacy of anti-smoking and smoking behavior between experimental and control groups in the immediately post-test and the follow-up test ($p < 0.05$). However, there was no significant differences in the recognition of hazards of smoking at eiter time point. Conclusions and Implications for Practice: The findings of this study revealed that the anti-smoking program effectively improved self-efficacy of anti-smoking, and decreased the smoking behavior in urban aboriginals. They provide useful information as a reference regarding of aboriginal health promotion to health providers. It is imperative that anti-smoking be reinforced for those regular smokers to prevent induction of lung cancer.

Keywords: Lung cancer - urban aboriginals - anti-smoking program - smoking behavior - Taiwan

Asian Pac J Cancer Prev, **14 (11)**, 6451-6457

Introduction

Aborigines are the indigenous people who originally lived in Taiwan. Those that moved to an urban city for work are known as the urban aborigines. Since aboriginal populations in developing countries are more likely to lack cultural, economic and political clout, their suicide rate is continually increasing (Boyle et al., 2009). Some factors, such as socioeconomic status, malnutrition, unemployment, poor medical and sanitary conditions, and insufficient health knowledge effects the health problems of the aborigines. In addition, inherited diseases such as kidney disease or diabetic mellitus also contribute to the aborigines' health problems (Boyle et al., 2009; Kotalik, 2009). Moreover, studies have demonstrated that smoking is a significant precipitant of health problems in the aboriginal population (CDC, 2008). The risk factors for smoking are critical issues nowadays. According to Ministry of Health and Welfare, lung cancer is the first leading death of cancer in Taiwan. Tobacco use is the leading cause of lung cancer worldwide and is estimated to kill 5 million persons each year. According to the World Health Organization (2009), if current trends continue, by 2030 tobacco use could cause 8 million deaths annually (Anonymous, 2010). Fortunately, one's smoking behavior can be modified (MacPherson et al., 2006). The dynamics of smoking behavior consist of five stages. The five stages include: pre-contemplation, contemplation, preparation, action, and maintenance (Herzog, 2007). Therefore, it is important to apply antismoking strategies to a particular stage in order to reduce the smoking rate. A smoking prevention program promulgated by the mass media for adults and adolescents can effectively decrease smoking behavior. Also, studies have shown that it is useful to

*[1]Chang Gung University of Science and Technology, [2]National Taiwan Normal University, [3]Landseed Hospital, [4]National Taipei University of Nursing and Health Sciences, Taipei, Taiwan [&]Equal contributors *For correspondence: mhlin@gw.cgust.edu.tw, huangsj@ntnu.edu.tw*

target smoking prevention and intervention to aborigines with the following characteristics between 20 and 40 years of age; with some degree of elementary or junior high school education; living in an urban setting; and who work in a technical job.

The teaching skills of social learning theory are broadly applied to various fields (McAlister et al., 2008). The teaching contents of social learning theory include activities during classes. It might be helpful to enhance a subject's confidence and correct smoking behavior through various teaching methods. Based on interactions with specific subjects, teaching hours were set from one to two hours per week and maintained for four weeks (Serrano et al., 2004; McAlister et al., 2008). The particulars of social learning theory include modeling, skill training, behavioral contracting and self-monitoring. According to modeling of social learning theory, it denotes an efficient way for a learner's behavior to change by observing another person accomplish the behavior. Also, video role playing could be effectively used in modeling (McAlister et al., 2008). 2. Furthermore, skill training is often used to change behavior. The more complicated the behaviors are, the more competent the skills are required for the learners. A person is able to accomplish the behavioral change through feedback, which reinforces appropriate behavior (McAlister et al., 2008). 3. Behavioral contracting is also an essential method used in the process of changing behavior; 4. A study of self-monitoring has been completed that pertains to the implementation of a smoking cessation program for patients with high cholesterol levels, low physical activity, tobacco smoking, and a high body mass. Subjects were randomly divided into experimental and control groups. In the experimental group, self-monitoring, reinforcement, and attitude changes were attempted, and the control group did not receive any intervention. The results demonstrated that the intervention effectively reduced cholesterol, increased physical activities, and improved the smoking cessation rate.

Since participation and observation of daily activities by families and communities are common learning styles for aborigines, it is important to ponder the cultural aspects of aboriginal population under study (Christakis et al., 2008; Kegler et al., 2000). At this point, to fully comprehend the aboriginal culture, researchers have to observe the aboriginal tribes. Of note, the aborigines' learning styles are not only influenced by their observations and imitation, but also by a connection between work and daily life which further enhances self-learning (Rasmussen et al., 2004). Thus, in order to sufficiently achieve the goal of a behavioral change for these aborigines, the utilization of an appropriately designed health education intervention is needed (Sue et al., 2006).

In general, the aborigines tend to encounter social and cultural challenges and subsequent maladjustment in the urban setting. Consequently, aborigines developed addictions to smoking and alcohol in order to diminish their stress (Boyle et al., 2009). Smoking and alcohol are harmful to one's health. It was critical for the health educator to apply a health education theory to help those urban aborigines increase self-efficacy, have a better tobacco smoking perception, to eventually terminate smoking behavior, and thereby promote healthy behavior. Although both the local health bureau and the public health clinic play a role in providing health education, success is limited due to the limitation of time, manpower, and financial support (Rudatsikira1 et al., 2008). The purpose of this study was to enhance the recognition in hazard of smoking, antismoking self-efficacy, and then reduce smoking behavior and promote healthier behavior for those urban aborigines through a proper intervention program to prevent lung cancer.

Materials and Methods

Design and Sampling

A quasi-experimental design was employed. According to the Council of Indigenous Peoples (Council of Indigenous Peoples, 2013), there are about half million urban aborigines in Taiwan. Due to the limitation of manpower, budget, and time, a purposive sampling was employed. In order to ensure enrollment of aborigines only, subjects were recruited from an aboriginal church in the Shu-Lin area. Those subjects were then randomly divided into experimental and control groups. Before health education intervention occurred, a pretest was given to both groups. Only the experimental group received a total of six hours of an anti-smoking prevention programs during a 3 week period. An immediate post-test was also administered just after the health education intervention occurred. Also, a delay post-test was conducted four weeks after the completion of the health education intervention in order to determine the relatively long term (delayed) effects of the intervention program. All participants signed a written consent form before the start of the study, and confidentiality of responses was assured.

Instrumentation and Measurement

The health education intervention evaluation consisted of three subscales and a total of 20 questions were developed in accordance with the results of previous studies (Stairs, 1995; William et al., 2001). The content of the three subscales were smoking behavior, antismoking self-efficacy, and tobacco smoking perception questionnaires. The content validity was verified according to the suggestion from eleven experts who were public health educators, aboriginal culture scholars, and antismoking specialists. A pilot study was administered to 60 aborigines. The questionnaire was revised according to the results of the pilot study and the subjects' opinions. Internal consistency for the scale on smoking behavior, antismoking self- efficacy, and tobacco smoking perception were 0.81, 0.98 and 0.76 respectively. These results suggested that the scales were suitable for the evaluation of the health education intervention utilized. In the smoking behavior subscale, the higher the score achieved, the more the smoking completed. The antismoking self-efficacy indicated the degree of the participant's confidence level in avoiding smoking in different circumstances. The higher the score achieved by the subject, the greater the confidence acquired by the participant. The tobacco smoking perception subscale

Table 1. Demographic Characteristics Between the Experimental and Control Groups

Variables	Experiment group (n = 64)			Control group (n = 61)			Total (n = 125)			χ^2
	n (%)	*M*	*SD*	*N (%)*	*M*	*SD*	*n (%)*	*M*	*SD*	
Gender										0.07
Male	31(48.40)			30(49.20)			61(48.40)			
Female	33(51.60)			31(50.80)			64(51.60)			
Marital Status										1.35
Married	34(53.10)			27(44.30)			61(48.40)			
Unmarried	24(37.50)			25(41.00)			49(39.20)			
Others	6(9.40)			9(14.80)			15(12.00)			
Age		31.5	11.8		32.7	13.2		32.13	12.5	8.78
15-20	16(25.00)			12(29.70)			28(22.40)			
21-30	15(23.40)			21(34.40)			36(28.80)			
31-40	20(31.30)			8(13.10)			28(22.40)			
41-50	8(12.50)			15(24.60)			23(18.40)			
Above 51	5(7.80)			5(8.20)			10(8.00)			
Levels of Education										7.01
College or above	10(15.60)			15(24.60)			25(20.00)			
High school	27(42.20)			16(26.20)			43(34.40)			
Junior high school	17(26.60)			15(24.60)			32(25.60)			
Literacy	10(15.60)			15(24.60)			25(20.00)			
Tribes										2.01
Amis	35(54.70)			28(45.90)			63(50.40)			
Puyuma	5(7.80)			8(13.10)			13(10.40)			
Bunun	17(26.60)			15(24.60)			32(25.60)			
Others	7(10.90)			10(16.40)			17(13.60)			
Occupational Situation										1.87
No	14(21.90)			20(32.80)			34(27.20)			
Yes	50(78.10)			41(67.20)			91(72.80)			
Smoking Behavior										1.96
Never smokers	28(43.80)			15(24.60)			43(34.40)			
Former smokers	18(28.10)			8(13.10)			26(20.80)			
Occasional smokers	7(10.90)			13(21.30)			20(16.00)			
Current smokers	11(17.20)			25(41.00)			36(28.80)			

indicated the subject's smoking perception about the health hazards of smoking. The higher the score determined, the worse the tobacco smoking perception was. Furthermore, equipment made by Micro Medical, was utilized to measure the CO concentration of study participants. Subjects in the experimental group were asked to record the amount of tobacco smoked before and after the health education intervention occurred. The value of the CO concentration was compared to the results of a self-reporting questionnaire pertaining to the amount of tobacco smoked. By using a coefficient correlation analysis, a positive correlation was found for both the pretest and the immediate post-test results (pretest = 0.19; immediate post-test = 0.36 respectively), and it indicated the reliability of the self-reporting questionnaires.

Anti-Smoking Program

The anti-smoking intervention for urban aboriginal was developed by referencing related literature (McGraw et al., 1994; Dijkstra et al., 2000; Paavola et al., 2001). Teaching materials, teaching plans and a brochure for the antismoking programs were utilized in our intervention program. Furthermore, teaching skills of social learning were also applied to the health education intervention programs. Utilized concepts included: social support, adjusting the incorrect perception, the development of a health promoting model, and enhancing behavior-based abilities. Other concepts implemented included: increasing self-efficacy, emotional adaptation, and positive thinking according to the subjects' characteristics (Dijkstra et al., 2000; Paavola et al., 2001).

The education program, designed by the researcher, comprised three individual sessions. Each 2-hour session was taught by researcher. The first session covered information pertinent to the understanding of the risk factors of smoking. The second introduced methods of smoking prevention. The fourth covered appropriate techniques for self-management, including antismoking self-efficacy, the behavior contract and self-control. The teaching activities and learning brochure were made according to the observations and findings of previous studies (McGraw et al., 1994; Dijkstra et al., 2000; Paavola et al., 2001) those were used during each session. At the end of the class, participants were encouraged to discuss the information and concerns with the group. Subjects would immediately receive positive reinforcement once the teaching goals were reached.

Data Analysis

Data were analyzed by SPSS for Windows version 12.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistical analyses were used to describe subject variable distribution using mean, standard deviations, frequencies, and percentage. Chi-square was used to examine differences between the experimental group and control group in terms of pretest score. One way ANCOVA was conducted to find the Differences in immediately effect for experimental and control groups were assessed, respectively, after program

Table 2. Comparison of the Variable Score Distribution Between the Experimental and Control Groups

Group	Tobacco smoking perception		Antismoking self-efficacy		Smoking behavior	
	M	*SD*	*M*	*SD*	*M*	*SD*
Experimental group (n=64)						
Pre-test	5.14	1.82	3.96	1.51	7.21	8.37
Immediately post-test	7.29	1.76	4.15	1.39	4.37	5.81
Delay post-test	6.89	1.44	4.50	1.13	2.76	7.91
Control group (n=61)						
Pre-test	5.88	3.04	2.78	1.98	7.70	9.66
Immediately Post-test	7.03	2.34	2.68	1.83	7.32	6.93
Delay post-test	7.55	2.01	2.59	1.90	5.16	9.77

intervention using, with pretest variable used as covariates. Finally, differences in posttest scores for both groups were assessed, respectively, after program intervention using Repeat Measure ANCOVA, with pretest variable used as covariates.

Results

Characteristics of the Subjects

There were total 125 subjects who consisted of 64 subjects in experimental group and 61 subjects in control group. The mean age of subjects was 32.13 with a range from 15 to 78 years old. 54% of subjects had above high school education. A majority of subjects in this study belong to A-mai tribe (experimental group=55%, control group=46% respectively). Ninety-one percent of participants were employed. Also, more than half of the subjects had a smoking experience (experimental group=53.6%, control group=80.3% respectively). Data collected from the pretest was analyzed by χ^2.

The Effect on Recognition in Hazard of Smoking through Health Education Program

The average scores of the pretest, the immediate post-test and the delayed post-test for tobacco smoking perception are presented in Table 2. The results showed that the immediate post-test score was obviously increased in both groups; although, the experimental group's score was higher than that of the control group. However, the pretest and immediate post-test scores of the experimental group was lower than those of the control group. The recognition in hazard of smoking due to the intervention is shown in Table 3. There were no significant differences caused by the education intervention in the immediate post-test for the recognition in hazard of smoking between the two groups (F=2.57, p<.01). The immediate effect on recognition in hazard of smoking, induced by the intervention, was not apparent. Also, there was no statistically significant difference evident in the results pertaining to recognition in hazard of smoking on the delayed post-test. Specifically, the smoking perception is presented in Table 4 (F=2.73, p<.01). These results indicated that the delayed effect on recognition in hazard of smoking was not obvious.

The Effect on Antismoking Self-efficacy Through Health Education Program

As shown in Table 2, the average test result score of the immediate post-test for antismoking self-efficacy was increased in the experimental group, but was decreased in the control group. In addition, the score of the immediate post-test significantly rose in the experimental group, while the score obviously decreased in the control group. The immediate effect of the intervention on antismoking self-efficacy is presented in Table 3. There was a significant difference in the immediate test for antismoking self-efficacy between the two groups (F=12.08, p<.01). Also, the score in the experimental group was higher than in the control group. This can be explained by the intervention program's positive effect on the antismoking self-efficacy of subjects in the experimental group. The delayed effect on antismoking self-efficacy is shown in Table 4. A statistically significant difference in antismoking self-efficacy was evident even four weeks after the educational intervention was completed. The average score in experimental group was higher than that of the control group. The results demonstrated that the positive

Table 3. Summary of ANCOVA Scores for the Experimental and Control Groups

Variable	Adjusted mean		Sums of Square	df.	Mean of Square	*F* value
	Experimental	Control				
Tobacco Smoking Perception	7.43	6.90				
Groups			8.87	1	8.87	2.57
Covariance			104.24	1	104.24	1.86
Error term			421.06	122	3.45	
Total			6950.00	125		
Antismoking self-efficacy	3.74	3.11				
Groups			11.36	1	11.36	12.08**
Covariance			210.10	1	210.10	223.45
Error term			114.71	122	0.94	
Total			1866.74	125		
Smoking behavior	4.54	7.17				
Groups			214.82	1	214.82	5.19**
Covariance			4597.28	1	4597.28	111.13
Error term			5047.16	122	41.37	
Total			14145.00	125		

Note: Pretest values of the experimental and control groups were used as the covariate; **p < 0.01

Table 4. Summary of Repeat Measure ANCOVA Scores for the Experimental and Control Groups

Variable	Adjusted mean		Sums of Square	df.	Mean of Square	*F* value
	Experimental	Control				
Tobacco smoking perception	6.94	7.51				
Groups			9.37	1	9.37	2.73
Covariance			6.37	1	6.37	1.86
Error term			202.18	59	3.43	
Total			6898.00	125		
Antismoking self-efficacy	4.16	3.06				
Groups			29.37	1	29.37	22.02**
Covariance			82.99	1	82.99	62.23
Error term			76.69	59	1.33	
Total			2012.40	125		
Smoking behavior	2.92	5.09				
Groups			143.13	1	143.13	5.28**
Covariance			1057.21	1	1057.21	38.98
Error term			1600.40	59	27.13	

Note: Pretest values of the experimental and control groups were used as the covariate; $^{**}p < 0.01$

effect on antismoking self-efficacy was induced by the intervention.

The Effect on Smoking Behavior Through Health Education Program

As shown in Table 2, the immediate test score in the experimental group was decreased. This finding indicated that smoking behavior was reduced by the educational program. On the other hand, the post-test score rose for the control group. Three weeks after the education activities were completed, the post-test score was significantly reduced in the experimental group. This result indicated that the health education intervention effectively reduced smoking in the experimental group. The immediate effect of the health intervention program on smoking behavior is presented in Table 3. There was a significant difference in the smoking behavior between two groups (F=5.19, p<.01). The average score for smoking behavior was determined from the responses reviewed on the subjects' self-reporting questionnaires. The higher scores indicated more tobacco smoking by the subjects. The immediate post-test score in the control group was higher than that of the experimental group. This indicated that the education program had a positive effect on reducing the amount of smoking in the experimental group. The effects of the intervention program, as ascertained from the 4-week delay post-test scores, on smoking behavior is presented in Table 4. These results demonstrated a significant difference in smoking behavior between the two groups (F=5.28, p<.01). Based on the average scores of the two groups, the score for the control-group's post-test was found to be higher than in the experimental group. This result demonstrated that participation in the educational intervention program caused a significant reduction in the smoking behavior of the experimental group and this was evident upon testing 4-weeks after completion of the intervention program.

Discussion

The Effectiveness of Recognition in Hazard of Smoking through Health Education Program: Results showed that the immediate post-test and delay post-test scores for recognition in hazard of smoking in experimental group were lower than in the control group. These findings indicated that the intervention did not affect the tobacco smoking perception for those urban aborigines. Surprisingly, these findings were different than reported in previous studies which showed that the tobacco smoking perception could be effectively influenced by a health education intervention (Rigotti et al., 1997; Andrew et al., 2001; William et al., 2001; Cornuz et al., 2002; Hajek et al., 2002). Some of the reasons that might be responsible for this ineffectiveness include the use of a purposive sampling instead of a random sampling method. Furthermore, subjects were recruited from two churches in Shu-Lin Taipei and a selection bias might have existed due to the different abilities of the subjects in each group.

The results of our study were consistent with previous findings that demonstrated no significant difference in smoking prevention after the completion of an intervention program (Aveyard et al., 1999). This in part may have occurred because a cluster random sampling was used in the study of Aveyard et al. (1999) and participants were not clearly classified. For this reason, it was difficult to assess the effectiveness of the intervention for all subjects. Therefore, compensating for the different smoking levels of each subject would be helpful for designing targeted intervention programs for the participants.

Secondly, although the data was anonymously collected, the answers might have been affected by subjective perception and the subject's recall, especially for knowledge examination. Moreover, due to time limitations, class lectures were mainly used for three separate educational activities. Even though providing a class lecture was the common modality, this method was more effective than using teaching material only (William et al., 2001). Class lectures were boring for many of the aborigines (Barton, 2004). For this reason, the immediate and delayed effects on the recognition in hazard of smoking were not affected by the education activities provided.

Furthermore, another reason that may be responsible for the ineffectiveness of the intervention program on

the recognition in hazard of smoking was that some daughters of subjects in the control group were nursing students. Thus, participants in the control group had more contact with information related to smoking prevention. That may have been why the score for the recognition in hazard of smoking in the control group was higher than in the experimental group. In conclusion, the results of this study demonstrated that not only design bias and demographic variables had to be controlled, but also the subject selection bias should be considered.

The Effectiveness on Antismoking Self-efficacy through Health Education Program: The results showed that both the immediate post-test and delay post-test score for antismoking self-efficacy in the experimental group were higher than in control group. These results indicated that the immediate and delayed effect on antismoking self-efficacy in experimental group were affected by the education activities provided other smoking prevention studies showed that self-efficacy was positively related to health status. Self-efficacy was also one of the important components in a program designed to prevent smoking (Rigotti et al., 1997; Andrew et al., 2001; William et al., 2001; Hajek et al., 2002). Self-efficacy was an essential motivational factor to maintain and promote health behavior. Consequently, it is beneficial to increase the use of self-efficacy strategies in health prevention education to promote health.

The Effectiveness on Smoking Behavior through Health Education Program: The results showed that the immediate and delayed effects on smoking behavior, in the experimental group, were significantly improved by participating in the education intervention. Generally speaking, most people recognized smoking as a bad habit. Therefore, in many smoking prevention studies, it was essential to use the CO measuring equipment as a supplementary means of avoiding dishonest responses when completing the questionnaires. The findings of this study are consistent with some previous studies in which the delayed effect on smoking behavior was improved by an educational intervention program (Andrew et al., 2001; William et al., 2001; Cornuz et al., 2002).

Conclusion: This study demonstrated that the recognition in hazard of smoking in the experimental group was not affected by the health educational intervention. However, by implementing this program, the antismoking self-efficacy was enhanced, and the smoking behavior was improved in the experimental group. It was well known that knowledge could influence attitude, and then facilitate the desired behavioral change. Thus, it would be helpful to strengthen the concept of self-efficacy to augment the effectiveness of the tobacco smoking perception in the future. Future studies might take advantage of developing multidisciplinary learning realms and teaching strategies. This might be facilitated by using computers and appropriate software as supplementary teaching materials. Other approaches might include inviting smoking prevention specialists to present lectures and thereby enhance the subject's smoking perception.

Subjects who were smokers were divided into several groups based on their varying levels of smoking. These individuals were provided diverse education activities. Moreover, a future longitudinal study for urban aborigines would need to carefully explore the smoking culture and current smoking situation of various tribes. Furthermore, the researchers of the current study found that the pastor played a key role in teaching the urban aborigines. Since those aborigines left their own town to move to the urban area, they suffered from stress in their new setting. Churches were places where these aborigines could gain comfort and support. Hence, it was important to ask the pastors for assistance in performing this study, in order to implement the educational programs smoothly. The results of this research is beneficial for those devoted to lung cancer prevention research.

References

Andrew S, Sally K, Elizabeth R, Sean H (2001). The impact of behavioral counseling on stage of change in fat intake, physical activity, and cigarette smoking in adults at increased risk of coronary heart disease. *Am J Public Health*, **91**, 265-9.

Anonymous (2010). World No Tobacco Day. *MMWR*, **59**, 613.

Aveyard P, Cheng KK, Almond J, et al (1999). Cluster randomized controlled trial of expert system based on the transtheoretical ("stage of change")model for smoking prevention. *BMJ*, **319**, 948-3.

Barton SS (2004). Narrative inquiry: Locating aboriginal epistemology in a relational methodology. *J Adv Nurs*, **45**, 519-6.

Boyle T, Shepherd1 CCJ, Pearson1 G, et al (2009). Awareness and impact of the 'Bubblewrap' advertising campaign among aboriginal smokers in Western Australia. *Tob Control*, **18**, 1-10.

Centers for Disease Control and Prevention (2008). Cigarette smoking among adults- United States, 2007. *MMWR*, **57**, 1221-6.

Christakis NA, Fowler JH (2008). The collective dynamics of smoking in a large social network. *New Engl J Med*, **358**, 2249-8.

Cornuz J, Humair J, Seematter L, Stoianov R, Stalder H (2002). Efficacy of resident training in smoking cessation: A randomized, controlled trial of a program based on application of behavioral theory and practice with standardize patients. *Ann Intern Med*, **136**, 429-7.

Council of Indigenous Peoples (2013). Indigenous people population statistical data. Retrieved September 3, 2013, from http://www. apc. gov. tw/ main/ docList/ docList. jsp? cateID= A000297& linkParent= 49 & linkSelf= 161 & linkRoot = 4 (Original work published in Chinese)

Dijkstra A, Vries H (2000). Subtypes of precontemplating smokers defined by different ling-term plans to change their smoking behavior. *Health Educ Res*, **15**, 423-4.

Dyck R, Klomp H, Turnell R, Boctor M (2002). A comparison of rates, risk factors, and outcomes of gestational diabetes between aboriginal and non-aboriginal women in the Saskatoon health district. *Diabetes Care*, **25**, 487-3.

Hajek P, Taylor T, Mills P (2002). Brief intervention during hospital admission to help patients to give up smoking after myocardial infarction and bypass surgery: randomized controlled trial. *BMJ*, **324**, 87-9.

Herzog TA (2007). Are the stages of change for smokers qualitatively distinct? An analysis using an adolescent sample. *Psychol Addict Behav,* **21**, 120-5.

Kegler MC, Cleaver VL, Yazzie-Valencia M (2000). An

exploration of the influence of family on cigarette smoking among American Indian adolescences. *Health Educ Res*, **15**, 547-7.

Kotalik J (2009). Aboriginal health care in Canada - bioethics perspective. *Formos J Med Humanit*, **10**, 119-5.

MacPherson L, Myers M, Johnson M(2006). Adolescent definitions of change in smoking behavior: An investigation. *Nicoine Tob Res*, **8**, 683-7.

McAlister AL, Perry CL, Parcel GS (2008). Social cognitive theory. In K. Glanz, BK, Rimer , K Viswanth (Eds.), Health Behavior and Health Education: Theory Research & Practice (4th ed., pp 167-185). San Francisco: Jossey-Bass.

McGraw SA, Stone EJ, Osganian SK, Elder JP, Perry CL., Johnson CC (1994). Design of process evaluation within the child and adolescent trial for cardiovascular health (CATCH). *Health Educ Q*, **2**, s5-s6.

Paavola M, Vartiainen E, Puska P (2001). Smoking cessation between teenage years and adulthood. *Health Educ Res*, **16**, 49-7.

Rasmussen C, Baydala L (2004). Learning patterns and education of aboriginal children: A review of the literature. *Can J Native Stud*, **24**, 317-2.

Rigotti N, Arnsten J, McKool K, et al (1997). Efficacy of a smoking cessation program for hospital patients. *Int Arch Med,* **157**, 2653-60.

Rudatsikira1 E, Muula AS, Siziya S, Mataya RH (2008). Correlates of cigarette smoking among school-going adolescents in Thailand: findings from the Thai global youth tobacco survey 2005. *Int Arch Med*, **1**, 1-8.

Serrano EL, Anderson JE (2004). The evaluation of food pyramid games, a bilingual computer nutrition education program for Latino youth. *JFCSE*, **22**, 1-6.

Sidney CZ (1997). Health gap between aboriginal and non-aboriginal people is wildering. *Br Med J*, **314**, 1148.

Stairs A (1995). Learning processes and teaching roles in native education: Culture base and cultural brokerage. In M Battiste, J Barman (Eds), The circle unfold (p39). San Francisco: Jossey-Bass.

Sue RL, Yang YH, Tseng TY (2006). Intervention study of the oral health education on the knowledge and behavior of aboriginal junior high school students. *CJDR*, **25**, 103-1.

William A, Ann D, Patricia H, Alain J (2001). Effectiveness of high school smoking cessation program. *Pediatrics*, **107**, 50-60.

World Health Organization (2009). WHO report on the global tobacco epidemic, 2009: implementing smoke-free environments. Retrieved September 2, 2010, from http:// www. who. int/ tobacco/ mpower/ en.

Young TK (2003). Review of research on aboriginal populations in Canada: relevance to their health needs. *Br Med J*, **327**, 419-32.