

Original Article**Effects of health education on cigarette smoking habits of young adults in tertiary institutions in a northern Nigerian state****Adekunle Salaudeen¹, Omotosho Musa², Tanimola Akande³, Oladimeji Bolarinwa⁴**

1. MBBS, FMCPH, FWACP, Lecturer I, Department of Epidemiology & Community Health, College of Health Sciences, University of Ilorin, Ilorin, Nigeria
2. MBBS, FMCPH, FWACP, Senior Lecturer, Department of Epidemiology & Community Health, College of Health Sciences, University of Ilorin, Ilorin, Nigeria
3. MBBS, MSc, FMCPH, Associate Professor, Department of Epidemiology & Community Health, College of Health Sciences, University of Ilorin, Ilorin, Nigeria
4. MBBS, FWACP, Lecturer I, Department of Health Information Management, College of Health Sciences, University of Ilorin, Ilorin, Nigeria

Abstract

Objectives: The study assessed the effects of health education intervention on knowledge of health hazards, attitude and practice of cigarette smoking among students of College of Education, Ilorin, Kwara State, Nigeria.

Methodology: This is an intervention study conducted using the students of College of Education, Oro, Kwara State as the control group. The study was in 3 stages: pre-intervention, intervention and post-intervention. At the pre-intervention phase, 280 students were selected in each of the study and control groups by multistage sampling technique. Self-administered questionnaire was used for data collection. In the intervention stage, health education was given to the students of College of Education, Ilorin. Impact of intervention was assessed by re-assessing knowledge, attitude and practice of the students after intervention.

Results: Pre- intervention, 67.9% of the study group and 64.2% of the control group were aware that cigarette smoking was associated with lung cancer. However fewer respondents in both groups (9.6% in the study and 12.9% in the control) were aware of the association with cardiovascular problems. About one quarter of the respondents in both groups had smoked cigarette at one time or the other. More than three quarters of smokers in both groups were males. The majority of the respondents learnt to smoke from their friends (51.0% of the study group and 60.4% of the control group).

After the health education intervention statistically significant increase in awareness of health problems associated with cigarette smoking was found in the study group unlike the control group.

Conclusion: The study demonstrated that health education is effective in changing attitude to cigarette smoking. It is recommended that continuous health education programmes on smoking should be organized by institutions, associations and societies within and outside the schools as this will make them well informed towards behavioural change.

Key words: Health education, cigarette smoking, young adults, tertiary institutions

Corresponding author:

Dr. A. G. Salaudeen
Department of Epidemiology & Community
Health,
College of Health Sciences University Of Ilorin,

P.O. Box 4465,
Ilorin, Nigeria.
E-mail: adekunlesalaudeen@yahoo.com

Introduction

Tobacco is the most important preventable cause of premature death in many countries, and half of persistent smokers who start smoking in adolescence will die from the use of tobacco.¹ The health risks of tobacco are vastly underestimated because of the 30-40 year time lag between the onset of smoking and the peak in the deaths that it causes. In the developing world, tobacco poses a major challenge, not just to health, but also to social and economic development, and to environmental sustainability. In 1994, World Bank estimated that the use of tobacco results in a global net loss of US \$200,000 million per year, with half of these losses occurring in developing countries.¹

Geographical variation in the prevalence of cigarette smoking contributes to differences in the mortality patterns of smoking related diseases such as lung cancer, chronic obstructive lung disease and coronary heart diseases.² The World Health Organization (WHO) at the forty-second World Health Assembly recognized that worldwide the use of tobacco is responsible for two million premature deaths annually,¹ and support active efforts to resolve the economic issues involved in reducing tobacco production. WHO is also concerned about increasing tobacco consumption in developing countries while its use is decreasing in developed countries. The costs of tobacco go far beyond the health consequences as it has a significant economic and social burden on families and societies. Most smokers in Nigeria's cities believe smoking is bad for them yet they smoke.³ Some prefer to buy imported cigarette even at the cost of going without foods. Studies have shown smoking prevalence between 3.4% to 17.1% in secondary school in Nigeria^{4,5,6} and main factors influencing smoking habits of adolescent in Nigeria as peer influence, parental influence, advertisement and low level of education.^{6,7}

The anti-smoking health education intervention programme among school children in the black townships of Guguleta and Lange near Cape town in South Africa

has found out that the children confidence increased and their use of tobacco decreased compared with children at the control school.^{8,9} Health education has been found to increase the knowledge of the participants including school children about health effects of cigarette smoking, attitudes towards the use of tobacco and the consumption of tobacco products in Italy, Baltic republic and in Hong Kong respectively.^{10,11,12} Elsewhere around the globe, interventions geared toward education and improving the knowledge of adolescents and youths have proved to reduce probabilities of initiation^{13,14,15} and cessation^{13,14,15,16} of smoking. In Helsinki¹⁷ and Romania adolescents such anti-smoking intervention has improved attitude and behaviour to smoking.¹⁸ However in some other studies in Italy¹⁹ and South Korea,²⁰ the interventions did not influence adolescent behaviour as anticipated.

The survey is aimed at evaluating the effect of health education intervention on cigarette smoking as well as on knowledge of health hazards resulting from it among the study population.

Methods

The study was conducted in Colleges of Education in Kwara State, North Central Nigeria. The Colleges of Education in Kwara State were purposively selected but randomly allocated as study and control Colleges. The College of Education, Ilorin was the study group while the control group was selected from College of Education, Oro, Kwara State. Oro is about 60 kilometers South of Ilorin. The study focused on the full-time students of the two Colleges of Education. Part-time and sandwich students were excluded from the study. The students of the College of Education, Oro, Kwara State were used as the control group because of similarities in social, demographic, and cultural background to the intervention group.

Permission for the study was obtained from the Deans Student Affairs and Registrars

of the two Colleges. A preliminary discussion with the students of the two Colleges through the Students Union Leaders and some Class Representatives was carried out. Meetings with the Executives of the Students Union to enhance cooperation and participation in the survey were held. Consent was sought before participation in the survey.

Multistage sampling technique was adopted in the study. In the first stage, a simple random sampling technique by balloting was adopted to select two schools out of five in each of the Colleges which served as the study and control groups. The list of students in the selected schools served as the sampling frame for the study and control groups. There were 1,689 students in the two selected schools in the intervention College and 1,298 students in the two selected schools in the control College.

The respondents were identified by matriculation numbers, departments, levels of education and the number on the sampling frame for easy tracing. Systematic random sampling was used to pick the respondents in the study and control groups. The respondents were picked systematically with sampling interval of 6 and 4 for the study and control groups respectively. Those that were not in the school were replaced by the next person in the sampling frame. In all, a total of 280 students were recruited in each of the study and control groups, however, 240 and 271 subjects responded from the study and control groups respectively in the pre-intervention stage and they were followed up for evaluation. However, 238 and 252 students responded in the post-intervention phase for the study and control groups respectively.

There were three stages in the research viz: pre-intervention, intervention and post-intervention stages. The health education was given to the students of the College of Education, Ilorin. The health education focused on health hazards of cigarette smoking, factors influencing initiation of cigarette smoking, the strategies for quitting and ways of controlling cigarette smoking in the society. The students of College of Education, Oro (control group) were given health education at the end of the study.

Post-intervention stage was conducted using questionnaires containing the same questions as in the pre-intervention stage. The time interval between intervention and evaluation was six months.

Data generated with the questionnaires were edited and validated manually for errors and entered in to the computer for analysis using Epi-info version 2000 software package on the computer. Cross tabulation of variables was done and chi-square was used to determine the statistical significance of the differences in the pre- and post-intervention stage of the study where necessary.

Results

The mean age of respondents in the study group was 23.3 ± 3.2 years and that of the control group was 23.7 ± 3.8 years, the modal age was 23 years. Majority of the respondents were within 19-26 age group. The age distribution of the two groups were similar and there was no significant difference $p = 0.820$. Other socio-demographic characteristics like marital status, sex distribution, religion, and academic level distribution were similar for both the study and control groups.

Pre-intervention, among the respondents in the study group 205 (85.4%) knew that cigarette smoking is associated with health hazards as compared with 246 (90.8%) in the control group. In the study group, 172 (71.7%) knew that cigarette smoking may cause changes in the color of skin and palm as compared with 206 (76.0%) in the control group. Thirty people (12.5%) among the study group had suffered health problem related to cigarette smoking. In the control group, 35 (12.9%) had experienced health problem related to cigarette smoking.

Majority of respondents in both groups (67.9% in the study group and 64.2% in the control) knew that lung cancer could be associated with cigarette smoking. Few people 23 (9.6%) and 35 (12.9%) in the study group and control groups respectively knew that increased blood pressure. Also, few respondents 22 (9.2%) and 33 (12.2%) in the study and control groups respectively knew that relative infertility could be associated

with cigarette smoking. There was no significant difference in the knowledge of health problems of cigarette smoking in the two groups before health education ($p > 0.05$).

The knowledge of respondents in the study group on health problems associated with cigarette smoking increased after intervention. The observed increase in the knowledge of consequences of smoking in the study group after the health education was statistically significant $p < 0.05$. There was no significant difference in the knowledge of the control group on the health consequences associated with cigarette smoking before and after the health education intervention $p > 0.05$ (Table 3 and 4).

Among the respondents in the study group, 60 (25.0%) had smoked cigarette at one time or the other, 10 (4.2%) were females and 50 (20.8%) were males. In the control group, 66 (24.4%) had smoked cigarette, 16 (5.9%) were females and 50 (18.5%) were males. Pre intervention, majority of smokers in both groups had no intention of smoking cigarette in the future (90.0% of the study and control groups) while 16 (6.7%) of the study group and 17 (6.3%) of the control group had intention of smoking cigarette in the future. There was no significant difference between the study and control groups in intention to smoke in future ($p = 0.962$).

Among the respondents in the study group, 49 (20.4%) currently smoke cigarette while in the control group 53 (19.6%) currently smoke cigarette. There was an observed reduction in the proportion of the study group currently smoking cigarette after the health education, from 20.4% to 16.4%. Among the control group there was a reduction of 0.2% from 19.6% to 19.4%. The observed difference in both groups was not statistically significant $p > 0.05$.

Among the respondents who currently smoke cigarette, 24 (49.0%) in the study group and 29 (54.7%) in the control group smoked cigarette daily. About half of current smokers (25 (51.0%) in the study and 24 (45.3%) in the control groups) smoked occasionally. Fourteen (28.6%) of the current smokers in the study group started cigarette

smoking when they were less than 15 years while 35 (71.4%) started smoking when they were more than 15 years. In the control group, 20 (37.7%) started smoking before the age of 15 years and 33 (62.3%) started after the age of 15 years.

Twenty seven (55.1%) of current smokers in the study group had been smoking cigarette for less than 5 years while 12 (24.5%) had been smoking for more than 10 years. In the control group, 17 (32.1%) had been smoking for more than 10 years. The two groups were comparable as there was no significant difference pre-intervention in duration of smoking ($p = 0.623$). Fifteen (62.5%) of daily smokers in the study group smoked 1-5 sticks per day while 5 (20.8%) smoked more than 10 sticks per day. There was no significant difference in number of sticks smoked per day between the two groups ($p = 0.791$) indicating the similarities of the two groups.

Among the study group, 54 (22.5%) had family members who were cigarette smokers; while in the control group 74 (27.3%) had family members that smoked. Family members who were cigarette smokers were the uncle 23 (42.6%) and father 17 (31.5%) in the study group. Similarly in the control group, 21 (28.4%) and 26 (35.1%), uncle and father were smokers respectively (Table 1). Most of the current smokers (more than 75%) in the study and control groups were introduced to cigarette smoking by their friends and colleagues. In both groups, there were more smokers [47 (78.3%) in the study and 50 (75.8%) in the control groups] among the respondents who had relations that were cigarette smokers. The Relative Risk (RR) of smoking if there is a relation smoking cigarette is 12.45 in the study group and 8.32 in the control group. Therefore, the chances of a child smoking increases many fold if members of the family smoke cigarette.

Most common reason mentioned by respondents in both groups for smoking cigarette was fun, pleasure and for relaxation (Table 3). More than half of the study group 29 (59.2%) who smoked cigarette were secretive about it while in the control group, 27 (50.9%) hide cigarette smoking from people.

More respondents in the study 108 (45.0%) and control 117 (43.2%) groups strongly supported the idea of total ban on the sale of cigarette by the government. However, 30 (12.5%) of the study group and 41 (15.1%) of the control group opposed total ban on the sale of cigarette before intervention. There was no significant difference in the attitudes of the respondents in both groups ($p = 0.724$). The attitude of the respondents in the study group post intervention had changed as more of them (45.0% to 58.8%) strongly supported government efforts towards the ban of sale of cigarette. The difference in attitude of the study group was statistically significant ($p = 0.015$). However, among the respondents in the control group not as many ($p = 0.937$) had changed their attitude (Table 5).

More than half of the respondents in both groups (in the study group 137 (57.1%) and control group 150 (55.4%)) strongly supported government efforts on ban of cigarette advertisement. Nevertheless, 8 (3.3%) of the study group and 16 (5.9%) of the control group were indifferent on government efforts towards ban of cigarette advertisement. The attitudes of the two groups were similar as there was no significant difference between them ($p = 0.423$). After the health education intervention more respondents in the study group who initially strongly opposed 38 (15.8%) to ban of cigarette advertisement now strongly supported 160 (67.2%) government efforts towards ban of cigarette advertisement. There was a significant difference ($p = 0.006$) in the attitude of respondents in the study group after health education. There was no significant difference ($p = 0.411$) in the control group (Table 5).

About half of the respondents did not support sale of cigarette to children, (126 (52.5%) of the study group and 135 (49.8%) of the control group). Despite this, 63 (26.2%) of the study group and 69 (25.5%) of the control group were in support of sale of cigarette to the minors. The two groups were similar in opinion as there was no significant difference ($p = 0.646$) in their attitudes to sale of cigarette to minors. Following the health education of the study group many of

those who were indifferent (21.3%) or did not agree (52.5%) with prohibition of sale of cigarette to individuals less than 18 years before intervention now agreed (65.1%). The difference in the study group was statistically significant ($p = 0.000$). There was no significant difference ($p = 0.792$) in the control group (Table 6).

Some respondents in both groups [56 (23.3%) of the study group and 74 (27.3%) of the control group] strongly opposed the restriction of cigarette smoking in some areas. There was no significant difference in the attitudes of respondents to policy on smoke free areas in the two groups before health education ($p = 0.430$). Post intervention, more respondents (60.9%) in the study group strongly supported restricted areas of smoking cigarette as compared to 38.3% pre intervention. The difference is statistically significant ($p = 0.000002$). In the control group there was no significant difference ($p = 0.3023$) (Table 6).

Discussion

The mean age of respondents in the study and control groups was 23.33 years and 23.74 years respectively. The health education on consequences of cigarette smoking and the need to quit was appropriate in this age group because the age group experiment with many things including smoking. Also respondents in this study are future parents and at the same time teachers and role models in the training of the coming generations.

At the pre-intervention stage of the survey, respondents in both groups had good knowledge that cigarette smoking is associated with health problems. At least 85.4% of respondents in both groups knew that cigarette smoking is associated with health problems. This finding is consistent with study from Pakistan where 91.0% of the respondents were aware of health problems of cigarette smoking.²¹ This showed that respondents in this study are informed and had background information that smoking could be associated with health problems.

Dermatological changes are not uncommon among chronic cigarette smokers. The respondents in this survey knew that

cigarette smoking can cause changes in the colour of the skin and palm. About 71.0% of the study group and 76.0% of the control knew that cigarette smoking can cause changes in the colour of skin and palm. This finding was also reported in another study.²¹ This indicates that the respondents are not ignorant of dermatological changes associated with smoking.

The pre-intervention knowledge of respondents about association of lung cancer with cigarette smoking was high in the study (68%) and control (64.2%) groups. However, before intervention, knowledge about association of cardiovascular problems with cigarette smoking was low as only 9.6% and 12.9% of the study and control groups respectively knew about it. This was quite different from a study conducted in Pakistan where 88.9% associated smoking with respiratory disease and 24.9% identified smoking as a risk factor for heart disease.²¹ The possible reasons for the difference could be that smoking education is on-going in Pakistan as compared to Nigeria and the participants in Pakistan study were mainly patients attending hospital.

Post-intervention, the knowledge of the study group about health problems associated with smoking increased as more people in the study group now know some of the health problems associated with cigarette smoking. The observed increase in knowledge was statistically significant ($p < 0.05$). Similar increase in knowledge following intervention has been reported in studies conducted in South Africa Japan and Hong Kong.^{8,9,22,23} There was no significant increase in knowledge of health problems of smoking in the control group ($p > 0.5$).

About 25.0% of respondents in both groups had smoked cigarette at one time or the other; and the male-female ratio was 3:1 and 4:1 in the study and control groups respectively. Similar prevalence of cigarette smoking was found in a study conducted in Nigeria where 24.4% of males and 6.7% of females smoked cigarette.³ However; the prevalence was lower compared with the report of survey conducted in other study where the prevalence of smoking was 29.1%.²¹

Among the respondents who currently smoke cigarette, about half of them smoked cigarette daily while the other half smoked occasionally. There is likelihood that daily smokers will be more addicted to cigarette smoking and this might make smoking cessation difficult. More than two-third of respondents in the study group (71.4%), and 62.3% of the control group started cigarette smoking after the age of 15 years. The mean age of initiation to cigarette smoking was found to be 14 years in other studies.^{24,25} It is more likely that the younger the age at initiation the more tolerance and dependence on cigarette and therefore making cessation of smoking difficult. It has been reported that health problems develop quickly in the younger smokers.²⁶

Among the respondents who smoke daily, 62.5% of the study group and 69.0% of the control group smoked 1-5 sticks of cigarette daily. Also, 20.8% of the study group and 13.8% of the control group smoked more than 10 sticks of cigarette daily. This finding differs from study conducted in Lagos State among secondary school pupils where only 6.8% of the respondents smoked 10 sticks and above weekly. However, this observation is not surprising as younger age group was studied in Lagos state.

In both groups, respondents had family members who smoke cigarette. Some of the respondents' brother, cousin, father and uncle were regular smokers. The relative risk (R.R) of smoking cigarette if members of family are smokers was 12.45 for the study group and 8.32 for the control. Majority of the respondents learnt to smoke from their friends or colleagues then brothers and parents. Obviously peer influence and peer bonding is an important factor of initiation to cigarette smoking among the respondents. These findings are similar to that of the United States study which revealed that half of the children smoked their first cigarette with either an older friend or family members.²⁷

Respondents in this study strongly supported (45.0%) ban by the government on sale of cigarette. Others oppose or indifferent to ban of sale of cigarette. Similar observations were reported in Italy, Hong Kong and South Africa where 49.9%,

41.7% and 53.8% of the respondents respectively supported total ban on the sale of cigarette.^{9,10,11} Regarding attitude to cigarette smoking after intervention, the proportion of respondents in the study group that strongly supported ban of sale of cigarette increased from 45.0% to 58.8%. The proportion of respondents that opposed ban of sale of cigarette had reduced. The observed difference in the study group was statistically significant $p < 0.05$ while there is no significant difference in the control group. The health education intervention had imparted positively as many of them had changed their attitudes.

About half of respondents in both groups supported ban of sale of cigarette to children less than 18 years. Similar findings had been reported in South Africa and Pakistan where 63.5% and 96.9% of respondents respectively agreed that children should not be allowed to buy cigarette.^{8,21} In the Pakistan study, more respondents supported this idea. This could be because older people were involved in the Pakistan study. Following the health education intervention of the study group many of them who at pre-intervention stage were either indifferent (21.3%) or did not agree (52.5%) with prohibition of sale of cigarette to individuals less than 18 years now agreed (65.1%) with ban of sales of cigarette to minors. The observed difference was statistically significant $p < 0.05$. The significant change in attitude of the respondents after the health education has been supported with previous study.²³ This will prevent initiation and experimentation of cigarette smoking by children. In the control group, there was no significant difference.

While many respondents believed that imposing heavy tax on sale of cigarette, policy to ban sale of cigarette and stop the production of cigarette will control cigarette smoking, others believed health education and legislative procedure will assist to curb cigarette smoking. This was supported by smokers and non-smokers in this study and these findings have been supported with other studies.^{3,9,21} A combination of measures identified by the respondents in this study

will be very useful in smoking cessation programme.

After the health education more people in the study group were positively disposed to ban of cigarette advertisement. The respondents in the study group who initially strongly opposed (15.8%) to ban of cigarette advertisement had supported (67.2%) ban of cigarette advertisement after the health education. There was a statistically significant difference in the study group $p < 0.05$. However, in the control group there was no significant difference in attitudes to ban of cigarette advertisement $p > 0.05$. The aggressive marketing and advertisement of cigarette by Tobacco Companies need to be checked as suggested by the respondents in this study.

The attitudes of respondents regarding smoke free areas after intervention was examined. It was observed that more respondents (60.9%) in the study group strongly supported restricted areas of smoking compared with 38.3% before intervention. The difference was statistically significant $p < 0.05$. In the control group there was no significant difference. This will prevent the non-smokers from being exposed to cigarette smoke. Previous studies corroborated this finding.^{8,9,23}

Although there was no significant difference in the proportion of the study group who smoked cigarette after the health education intervention there was a reduction from 20.4% to 16.4%. In the control group, there was a reduction of only 0.2 percent. This finding is not surprising because the change in the smoking habit require a lot of effort and time. There is need for continuous smoking cessation education programs to reinforce the intervention given.

Also, at the post-intervention stage, more respondents in the study group who were smokers did not intend to continue smoking. The reduction of 17.8% was observed in the study group. The observed difference was statistically significant $p < 0.05$. In the control group, only 2.7% increase in the proportion of respondents in the control group post-intervention intended to stop smoking immediately. Similar observations have been reported in other studies.^{21,23} Health education activities had

increased the awareness, understanding and knowledge of the intervention group; this had influence positive change of attitudes to stop smoking.

About half of the smokers who wished to stop smoking intended to stop immediately. Others could not say when they will stop cigarette smoking. Among the study group, 67.3 percent had attempted quitting smoking while 60.4 percent of the control group also did. The problem associated with quitting smoking is multifaceted. In both groups, more than ninety percent were unsuccessful in their attempt to quit smoking. The addiction caused by nicotine is associated with poor outcome of smoking cessation programme. Multiple approaches will be required in smoking control programme.

In conclusion, the health education has been demonstrated to be effective in improving the knowledge of students of the danger of cigarette smoking and it also had changed their attitudes towards cigarette smoking as many of them now wish to stop cigarette smoking. This is because there was statistically significant difference in the knowledge and attitudes of respondents in the intervention group compared with the control group. There was no significant difference in smoking habit in both groups.

Bibliography

- World Health Organization. Guidelines for controlling and monitoring the tobacco epidemic. Geneva WHO. 1998; 1-150.
- Giovino G.A., Schooles M.W., Zhu B.P. Surveillance for selected tobacco use behaviour. United States 1900 - 1994. *CDC surveillance summaries*: MMWR 1994; 43.
- World Health Organization. Tobacco or Health: A Global status report, WHO. Geneva 1997; 114-117.
- Yisa IO, Lawoyin TO, Fatiregun AA, Emelumadu OF: Pattern of substance use among senior students of command secondary schools in Ibadan, Nigeria. *Niger J Med*. 2009; 18(1):98-102.
- Omokhodion FO, Faseru BO: Perception of cigarette smoking and advertisement among senior secondary school students in Ibadan, Southwestern Nigeria. *West Afr J Med*. 2007; 26(3):206-9.
- Odeyemi KA, Osibogun A, Akinsete AO, Sadiq L: The Prevalence and Predictors of Cigarette Smoking among Secondary School Students in Nigeria. *Niger Postgrad Med J*. 2009; 16(1):40-5.
- Osungbade KO, Oshiname FO: Determinants of cigarette smoking among senior secondary school students in a rural community of southwest Nigeria. *Niger J Med* 2008; 17(1):40-4.
- Hunter S., Steyn K., Yach D. Smoking Prevention in black schools. A feasibility study. *South African Journal of education*. 1991; 11: 137-142.
- Hunter S. Self-confidence enhancement: a new anti tobacco approach in South Africa. *American Journal of public health*. 1991; 81: 982-929.
- While D., Kelly S., Huang W., Charlton. A. Cause of absence from school related to children's and their parents smoking. *Tobacco control*. 1997; 6: 150 -1.
- Charlton A. Children and smoking: the family circle. *British Medical Bulletin* 1996; 52: 90-107.
- McNeill A.D. The development of dependence on smoking in children. *British Journal of Addiction*. 1991; 56: 589-92.
- Chapman B, Fiscella K, Duberstein P, Kawachi I. Education and Smoking: Confounding or effect modification by phenotypic personality traits? *Ann Behav Med*. 2009; 237-48
- Damien de Walque. Does education affects smoking behaviour?: Evidence using the Vietnam draft as an instruments for college education. *Journal of Health Economics*. 2007; 26 (5): 877-95.
- Oriol EJ. The Non-Monetary effects of Education on smoking in Spain. *European Journal of Education*. 2005; 40 (1): 46-58.
- Konin P, Webbink HD, Nicholas GM. The effects of Education on Smoking behaviour: New evidence from smoking duration of a sample of twins. *IZA Discussion Paper*. 2010; IZA DP No. 4796: 3-35
- Vartiainen E, Pennanen M, Haukkala A, Dijk F, Lehtovuori R, de Vries H. effects of a three - year smoking prevention

- programme in secondary school in Helsinki. *European Journal of Public Health*. 2007; 17 (3): 247-256.
18. Lotrean LM, Dijk F, Mesters I, Ionut C, de Vries H. Evaluation of a peer-led smoking prevention programme for Romanian adolescent. *Health Education Research*. 2010; 25 (5): 803 - 814.
 19. Bruno F, Giuseppe C, Anton E.K. Educational Inequalities in Initiation, cessation and Prevalence of Smoking among 3 Italian cohorts. *Am.J Public Health*. 2007; 97(5): 838-845.
 20. Park E. School based smoking prevention programs for adolescent in South Korea: a systematic review. *Health Educ. Res*. 2006; 21(3): 407-415.
 21. Khan J.A., Hussain S.F., Malik A., Shamsi G., Raza J., Mufti H. Knowledge, attitudes and the prevalence of smoking among hospital attendants in a developing country. *Tropical Doctor*. 2003; 33: 231-234.
 22. Lee FH, Wang HH. Effects of health education on prevention of smoking among eight-grade students. *Kaohsing J Med Sci*. 2002; 18(6): 295-304.
 23. Betson C.L., Lam T.H., Peters J., Hedley A.J., Wary C.M. A smoking intervention programme for primary school students in Hong Kong. In: Slama K. ed. *Proceedings of the 9th World conference on Tobacco and Health*. New York: Plenum press, 1995: 665-7.
 24. Gemma G. Children in Italy. In: Slama K. ed. *Proceedings of the 9th World Conference on Tobacco and Health*. New York: Plenum Press, 1995: 401-5.
 25. Adesanya W.J. Prevalence and factors contributing to cigarette smoking among students of secondary and post-secondary institutions in Ijebu-Ode Ogun State of Nigeria. FMCP Dissertation. May 1994: 84.
 26. Royal College of Physicians. *Smoking and the young*. London. Royal College of Physician, 1992; 25-29.
 27. Baugh J.G., Hunter S.M., Webber L.S., Berenson G.S. Developmental trends of first cigarette smoking experience of children: The Bagalusa heart study. *AM J Public Health*. 1982; 72 (10): 1161-4..

Appendix

Table 1 Distribution of respondents by family members who were smokers

	Study (%) n= 240		Control (%) n= 271	
	Smokers	Non-smokers	Smokers	Non-smokers
Relations that smoked	47 (78.3)	7 (3.9)	50 (75.8)	24 (11.7)
Relations who did not smoke	13 (21.7)	173 (96.1)	16 (24.2)	181 (88.3)
Total	60	180	66	205
Relative Risk (R.R)	12.45		8.32	

Table 2: Respondents' reasons for smoking cigarette*

Reasons	Group	
	Study (%) n=60	Control (%) n=66
Fun/Pleasure/Relaxation	48 (80.0)	51 (77.3)
Relief Problem	8 (13.3)	10 (15.2)
Reading	11 (18.3)	13 (19.7)
Experiment	14 (23.3)	16 (24.2)
Weight reduction	2 (3.3)	1 (1.5)

*multiple response

Table 3: Knowledge of the study group on health consequences of cigarette smoking

Consequences	Correct Knowledge (%)		X ² , df = 1, P-value
	Pre n = 240	Post n = 238	
Weight loss	64 (26.7)	180 (75.6)	X ² =114.65, 0.0000
Lung cancer	163 (67.9)	204 (85.7)	X ² =21.23, 0.00004
Increased BP	23 (9.6)	159 (66.8)	X ² =165.96, 0.0000
Relative Infertility	22 (9.2)	141 (59.2)	X ² =133.35, 0.0000
Dental problem	39 (16.2)	162 (68.1)	X ² =131.67, 0.0000
Addiction	54 (22.5)	172 (72.3)	X ² =118.75, 0.0000
Skin disorder	43 (17.9)	164 (68.9)	X ² =126.55, 0.0000

Table 4: Knowledge of the control group on health consequences of cigarette smoking

Consequences	Correct Knowledge (%)		X ² , df = 1 P-value
	Pre (n = 271)	Post (n = 252)	
Weight loss	89 (32.8)	82 (32.5)	X ² =0.01, 0.9414
Lung cancer	174 (64.2)	174 (69.0)	X ² =1.37, 0.2411
Increased B.P	35 (12.9)	23 (9.1)	X ² =1.90, 0.1680
Relative infertility	33 (12.2)	22 (8.7)	X ² =1.65, 0.1992
Dental problem	41 (15.1)	41 (16.3)	X ² =0.13, 0.7200
Addiction	39 (14.4)	36 (14.3)	X ² =0.00, 0.9726
Skin disorder	37 (13.6)	45 (17.9)	X ² =1.75, 0.1864

Table 5: Attitudes of the respondents towards total ban by the government on sale of cigarette and total ban on cigarette advertisement

Attitudes	Study (%)		Control (%)	
	Pre	Post	Pre	Post
Ban by government on sale of cigarette				
Strongly opposed	37 (15.4)	20 (8.4)	45 (16.6)	38 (15.1)
Opposed	30 (12.5)	21 (8.8)	41 (15.1)	35 (13.9)
Indifferent	15 (6.3)	9 (3.8)	21 (7.7)	17 (6.7)
Supported	50 (20.8)	48 (20.2)	47 (17.4)	46 (18.3)
Strongly supported	108 (45.0)	140 (58.8)	117 (43.2)	116 (46.0)
	$X^2 = 12.32$ df = 4 p = 0.015123		$X^2 = 0.81$ df = 4 p = 0.936972	
Ban of cigarette advertisement				
Strongly opposed	38 (15.8)	15 (6.3)	46 (17.0)	40 (15.9)
Opposed	24 (10.0)	17 (7.2)	18 (6.6)	24 (9.5)
Indifferent	8 (3.3)	5 (2.1)	16 (5.9)	8 (3.2)
Supported	33 (13.8)	41 (17.2)	41 (15.1)	34 (13.5)
Strongly supported	137 (57.1)	160 (67.2)	150 (55.4)	146 (57.9)
	$X^2 = 14.51$ df = 4 p = 0.005842		$X^2 = 3.96$ df = 4 p = 0.410793	

Table 6: Attitudes of the respondents to ban of sales of cigarette to minors and government policy on smoke free areas

Attitudes	Study (%)		Control (%)	
	Pre (n=240)	Post (n=238)	Pre (n=271)	Post (n=252)
Ban of sales of cigarette				
Disagree	126 (52.5)	57 (24.0)	135 (49.8)	133 (52.8)
Indifferent	5 (21.3)	26 (10.9)	67 (24.7)	58 (23.0)
Agree	63 (26.2)	155 (65.1)	69 (25.5)	61 (24.2)
P-value	$X^2 = 75.37$ df = 2 p = 0.000		$X^2 = 0.47$ df = 2 p = 0.792	
Government policy on Smoke-free areas				
Strongly opposed	56 (23.3)	23 (9.7)	74 (27.3)	59 (23.4)
Opposed	36 (15.0)	21 (8.8)	33 (12.2)	35 (13.9)
Indifferent	18 (7.5)	10 (4.2)	40 (14.8)	25 (9.9)
Supported	38 (15.9)	39 (16.4)	31 (11.4)	34 (13.5)
Strongly supported	92 (38.3)	145 (60.9)	93 (34.3)	99 (39.3)
P-value	$X^2 = 31.88$ df = 4 p = 0.000002		$X^2 = 4.85$ df = 4 p = 0.3026	

Table 7: Distribution of the respondents who currently smoke cigarette and those who intend to stop smoking

Response	Study (%)		Control (%)	
	Pre	Post	Pre	Post
Currently smoke				
	(n=240)	(n=238)	(n=271)	(n=252)
No	191 (79.6)	199 (83.6)	218 (80.4)	203 (80.6)
Yes	49 (20.4)	39 (16.4)	53 (19.6)	49 (19.4)
P-value	$X^2 = 1.29$, df = 1, p = 0.256		$X^2 = 0.00$, df = 1, p = 0.974	
Intend to stop Smoking				
	n=49	n = 39	n = 53	n = 49
No	14 (28.6)	5 (12.8)	16 (30.2)	12 (24.5)
Yes	35 (71.4)	34 (87.2)	37 (69.8)	37 (75.5)
P –value	$X^2 = 3.18$, df = 1, p = 0.074		$X^2 = 0.42$, df = 1, p = 0.519	