RESEARCH ARTICLE

Evaluation of a Specially Designed Tobacco Control Program to Reduce Tobacco Use among School Children in Kerala

Phinse Mappalakayil Philip[1]*, Neetu Ambali Parambil[1], Binukumar Bhaskarapillai[2], Satheesan Balasubramanian[1]

Abstract

Background: Smoking and smokeless tobacco use are almost always initiated and established during adolescence. More than 80% of adult smokers begin smoking before 18 years of age. The main objective of the present study is to assess the feasibility of preventing adolescent tobacco use with the help of a specially designed tobacco control program. Materials and Methods: A cross sectional survey on tobacco use and related health effects was conducted using a structured questionnaire in 13 randomly selected schools in Kannur district of Kerala. These students were followed for a period of one academic year with multiple spaced interventions such as anti-tobacco awareness classes, formation of anti-tobacco task forces, inter-school competitions, supplying IEC (information, education and communication) materials and providing a handbook on tobacco control for school personnel. Final evaluation was at the end of one year. Results: There were 4,144 school children who participated in the first phase of the study. The prevalence of tobacco smoking and chewing habits were 9.85% and 2.24% respectively. Ninety-one percent had parental advice against tobacco use and only 3.79% expressed desire for future tobacco use. The final evaluation witnessed a sharp decline in the current tobacco use as 4.68%. We observed a statistically significant difference towards the future use of tobacco (p<0.001) and awareness about the ill effects of passive smoking (p<0.001) among boys and girls. Further a significantly increased knowledge was observed among boys compared to girls about tobacco and oral cancer (p=0.046). Conclusions: The comprehensive school based tobacco control project significantly reduced the tobacco use pattern in the target population. School tobacco projects incorporating frequent follow ups and multiple interventions appear more effective than projects with single intervention.

Keywords: Tobacco use - smoking - prevalence - intervention

Introduction

Smoking and smokeless tobacco use are almost always initiated and established during adolescence. More than 80% of adult smokers begin smoking before 18 years of age. Additionally, adolescent smokeless tobacco users are more likely than nonusers to become adult cigarette smokers(US Department of Health Andhuman Services, 1994; Campaign for tobacco free kids 2009; CDC, 2010). For every person who dies from a smoking related disease, 20 more people suffer with at least one serious illness from smoking (CDC, 2003). Worldwide tobacco use causes more than 5 million deaths per year and current trend shows that tobacco use will cause more than 8 million deaths annually by 2030. On average, smokers die 13 to 14 years earlier than non-smokers (CDC, 2002).

In contemporary India, which is experiencing rapid epidemiological transition, several factors, particularly tobacco use, are contributing to a progressive rise in the burden of non-communicable diseases (Reddy et al., 2005). Deaths attributable to tobacco are expected to rise alarmingly in many developing nations of the world over the next two decades, with India having the fastest rate of rise in these deaths. Most of these deaths will occur in the productive years of adult life, as a consequence of an addiction acquired in youth (Reddy and Gupta, 2004). Tobacco use, in any form is a much greater public health challenge in India compared with other countries due to the many varieties in which tobacco is consumed. Different forms of tobacco products include smoke form such as bidis and cigarettes, cigars, hookah, kreteks, and smokeless forms such as betel quid, gutkha, mawa and khaini-chewed in the oral cavity and snuff- inhaled through nose and creamy snuff, which is a tobacco paste marketed as dentifrice. Cigarette smoking is more prevalent among urban population while the indigenous forms like bidis, betel quid, etc. are common among rural people. Local brands of packed chewing tobacco products are freely available in India.

Factors associated with tobacco use have been identified by many studies conducted inIndia. Some factors associated with youth tobacco use include low

[1]*Malabar Cancer Centre, Thalassery, Kerala,* [2]*Centre for Chronic Disease Control, New Delhi, India* *For correspondence: phinse1984@gmail.com*

socioeconomic status, use and approval of tobacco use by peers or siblings, lack of skills to resist influences to tobacco use, smoking by parents or guardians and/ or lack of parental support or involvement,accessibility, availability, and cheaper price of tobacco products, a perception that tobacco use is the norm, low levels of academic achievement, and low self-image or self-esteem (US Department of Health and Human Services, 1994; 2000).

Several strategies have been developed by the health authoritiesto reduce the use of tobacco products. The strategies in the past to counter the increasing tobacco menace include counter advertising through mass-media campaigns such as advertisement through television and radio commercials, posters, and other media messages targeted toward youth to counter pro-tobacco marketing. Other strategies include comprehensive school-based tobacco-use prevention policies and programs such as anti-tobacco campaigns and tobacco-free campuses, community interventions that reduce tobacco advertising, promotions, and commercial availability of tobacco products and higher costs for tobacco products through increased excise taxes. The current strategies are based on the six tobacco control policies recommended by the WHO known as MPOWER.The six components of MPOWER include monitor tobacco use and prevention policies, protect people from tobacco smoke, offer help to quit tobacco use, warn about the dangers of tobacco, enforce bans on tobacco advertising, promotion and sponsorship and raise taxes on tobacco (WHO, 2008). Studies have shown that anti-tobacco programs should begin when students are young due to important social, emotional, cognitive and biological changes that take place during this period (Kandelet al., 1992; Soldzet al., 2000). Empirical studies shows that 90% of those eventually die from smoking begin before age 18 (US Department of Health and Human Services, 1994). It would seem that majority of programs should focus on smoking prevention during adolescence. It is known in order for adolescent smoking prevention programs to work best in schools they need to be marketable, easily and rapidly disseminated and implemented- all while being cost effective (Cleary et al., 1998).

The main objective of the present communication is to identify the prevalence of tobacco use among school children and to study the feasibility of preventing adolescent tobacco use with the help of a specially designed tobacco control program. Moreover this study aimed at to disseminate the anti-tobacco message to community in general and family in particular through school children.

Materials and Methods

This study was designed for comprehensive tobacco control and prevention among school children of government and aided schools from Kannur district of the Kerala state in south India. The target population is students studying in class 8th to 12th standards and between the ages 13 to17 years. This study was carried out during the academic year 2011-2012. Thirteen schools were selected at random which included both government and aided schools. Among the selected schools there were eleven mixed schools where both boys and girls were being taught and one school each exclusively teachingfor girls or boys only.

A cross-sectional survey on prevalence of tobacco use and related health awareness was conducted among the children of selected schools using a structured questionnaire. A total of 4144 school children participated in the survey. The questionnaire consists of questions related to current tobacco use, ever tobacco use, parental tobacco use and tobacco related health awareness. The survey was administered in each class room by a trained team of 2 persons followed by an awareness session on ill effects of tobacco and distributed health education materials. Students were assured of the confidentiality of their responses.

A tobacco task force was constituted in the school comprising the teachers and peer leaders. The task force was entrusted with the no-tobacco activities of the respective schools and was organizing programs and awareness activities in the schools in association with the school health clubs. The task force was in contact with the project team and was regularly supplied with fact sheets, pamphlets and other educational materials needed to carry out the campaign on a monthly basis. This was continued for the entire project period. The junior public health nurses posted in these schools were actively participated and coordinated the activities at schools. We have also prepared a hand book on tobacco control for schools in local language as part of the project and supplied in all the participatory schools. The task forces in each school were asked to conduct anti-tobacco programs and tobacco related literary competitions. The project team provided all the necessary assistance for carrying out those activities.

The final evaluation of the project was done using a semi-structured questionnaire by the end of February 2012. Of the 4144 children participated in the first phase, 3378 school children participated in the second final evaluation. The questionnaire contain questions regarding the current tobacco use status of the child, second hand smoke, question assesses the children's ability to transform their parents and well-wishers and suggestions from the children on tobacco control strategies.

Distribution of qualitative variables was summarized using number and percentage. The association between qualitative variables was tested using chi-square test or Fisher's exact test, if the expected value of a cell was less than 5 for relevant variables. Stratified analysis according to gender was done for relevant variables. The level of significance for statistical tests was fixed at 5% (Armitage and Berry, 1994).

Results

There were 4144 school children participated in the first phase of the study which comprises of 62.7% boys and 37.3% girls. The distribution of tobacco and chewing habits among the students participated in the study was provided in Table 1. The prevalence of tobacco smoking habit among males and females are 15% and

1% respectively with an overall prevalence of 9.85%. Compared to smoking, the proportion of chewing tobacco habit is very less. A significantly higher proportion of boys have tobacco chewing habits compared to girls (3.38% vs 0.32%) (Table1). The chewing tobacco used by the students are local brands like hans, cool lip, khainietc. and none of them uses the traditional betel quid. Interestingly, girls have also started using the branded tobacco products.

Parental influences on tobacco habits can negatively affect the children's perception about tobacco and its distribution is given in Table 2. Approximately one-third of the participants reported that smoking habits in their family members. However the chewing habit is comparatively less than that of smoking and is prevalent in 240 families only. Almost 3784 children received parental advice regarding the ill effects of tobacco. Even though more than ninety percent of participants had advises against tobacco, the higher prevalence of tobacco use exist among children points out the need for additional strategies to combat the menace.

Desire for future tobacco use implies the positive perception of children towards tobacco use. The distribution of perception and knowledge on health hazard according to gender is provided in Table 3. Approximately 3.8% of children expressed the desire towards future use of tobacco. However we observed a statistically significant difference towards the future use of tobacco among boys and girls (p<0.001). A good proportion of children have a better understanding of the health effects of tobacco and below 2% of them only unaware about

the risks associated with passive smoking. Although the difference in awareness about the ill effects of passive smoking is very minimal across the gender it seems to be highly statistically significant (p<0.001). Although 84% of students know the relations between tobacco and oral cancer, a statistically significant increased levelof awareness was observed among boys compared to girls about tobacco and oral cancer (p=0.046) (Table 3).

The final evaluation of the study to assess the effectiveness of specially designed tobacco control program in reducing the prevalence of tobacco habits among school children was carried out in the month of February 2012. There were 3378 children who participated in the first phase only were involved in the final evaluation from all the 13 schools. Only those who participated in the initial survey were included in the final evaluation. The prevalence of tobacco habits was assessed and only 4.68 % of students use tobacco during the final evaluation (Table 4). Thus tobacco use has been decreased to nearly half after the intervention, although we missed 766 students during the final evaluation. The proportion of children subjected to passive smoking was approximately 56%; however around 34% of children has reported that they positively influenced their parents and well-wishers to quit tobacco.

Discussion

According to the India global youth tobacco survey (GYTS, 2009), reported a prevalence of tobacco use in any form of 14.6%, while only 4.4% uses cigarettes. Another study conducted byJayakrishnanet al among school children in Kerala report 9% of students use cigarettes (Jayakrishnanet al., 2011). Our study reports an increase in the cigarette smoking habit of the students particularly in the Northern part of Kerala. Among the 9.85% of children those have reported smoking habit, the main tobacco product consumed is cigarette and none of them used the hand rolled beedis. Similar tobacco use pattern were reported from a study conducted in Lagos

Table 1. Distribution of Tobacco Habits by Gender

Characteristics		Male (n=2600) %		Female (n=1544) %		Total (n=4144) %	
Tobacco smoke	Yes	393	15.1	15	0.97	408	9.85
	No	2207	84.9	1529	99.03	3736	90.15
Chewing tobacco	Yes	88	3.38	5	0.32	93	2.24
	No	2512	96.62	1539	89.68	4051	97.76

Table 2. Distribution of Parental Influence on Smoking Habits among Children

Familial influence		(n=4144)	%
Smoking habits in the family	Yes	1374	33.16
	No	2770	66.84
Chewing habits in the family	Yes	240	5.79
	No	3904	94.21
Children who had not received any parental advice regarding the ill effects of tobacco	Yes	360	8.69
	No	3784	91.31

Table 4. Distribution of Current Tobacco Habits and Second Hand Smoke

Habits		(n=3378)	%
Current tobacco use	Yes	158	4.68
	No	3220	95.32
Children reported passive smoking	Yes	1881	55.68
	No	1497	44.32
Children who positively influenced their parents and Well-wishers to quit tobacco	Yes	1141	33.78
	No	2237	66.22

Table 3. Distribution of Perception and Knowledge on Health Hazard by Gender

Habits		Male (n=2600) %		Female (n=1544) %		Total (n=4144) %		Chi square	p value
Desire for future tobacco use	Yes	151	5.81	6	0.39	157	3.79	78.05	<0.001*
	No	2449	94.1	1538	99.61	3987	96.21		
Children who unaware of the ill effects of passive smoking	Yes	66	2.54	12	0.78	78	1.88	16.27	<0.001*
	No	2534	97.4	1532	99.22	4066	98.12		
Believe tobacco will not cause cancer	Yes	400	15.3	274	17.75	674	16.26	3.98	0.046*
	No	2200	84.6	1270	82.25	3470	83.74	78.05	

*Statistically significant at 5% level

state in Nigeria (Odukoya et al., 2013).This preference towards branded cigarettes illustrates the fact that cigarette smoking has more acceptances among school children even in rural areas. The practice of chewing betel quid has much significance attached to it in India. But the practice of using packed chewing tobacco product is relatively new in rural India.

In this study we found a significant reduction in the number of current tobacco users during the final evaluation of the study. More than half of the tobacco users became non users and only 4.68% sticks to their previous habit. This sharp decline in the smoking pupil shows that those school tobacco programs incorporating multiple interventions within the given time frame can reduce the tobacco use to a great extent than the single intervention strategy. Many of the current practices use a single intervention strategy. Tobacco related health awareness class is the most commonly practiced intervention strategy. In this study we adopted a judicious mix of awareness class, frequent school visits, monitoring of student activities and ensuring their presence in tobacco related public functions. Literary competitions on tobacco were conducted in constituent schools.IEC materials were supplied in every month. Apart from these, school health junior public health nurses were given training in tobacco control and that helped them in coordinating the anti-tobacco activities at the schools.

Prevalence of tobacco use reported by female students in our study is 1%. During the final evaluation, none of the female students reported tobacco use. This shows that awareness and other intervention programs can greatly reduce the tobacco use among female students. A study conducted among female medical students in Saudai Arabia reported that prevalence of smoking among non-medical female students is higher than that among medical students (Azhar and Alsayed, 2012). This study clearly illustrates the need of health education in tobacco control.

Global adult tobacco survey India 2010 (GATS, 2010) reveals that 41.8% of adult were exposed to second hand smoke at home and 18.7% of adults were exposed to the same at public places. Due to the ban on smoking at public places, more number of people smoke at home. The real victims of the second hand smoke at home are women and children. Second hand smoke is a major issue to be addressed in any tobacco control program. School children are subjected to second hand smoke at school premises, bus stops, streets and most importantly at home. 33.16% of school children had either parent or relative as smoker. Even though smoking at public places has reduced to a significant level, its proportion at home and workplace remain high.

In this study we observed that around 56% of school children realize that they were forced to second hand smoke at some point of time in their life and 98% are aware of the ill effects of the second hand smoke. Awareness among parents is a necessity in our struggle against secondhand smoke. Lack of awareness is the major reason behind the second hand smoke at home. Many adults think that smoking will cause harm to them only and their kids are safe. In this era of nuclear family, parents are more concerned about their children and most of them are ready to sacrifice anything for them. Even a strong demand for quitting from the child's part can make tangible results. In the current study approximately 34% of participants positively influenced their parents and relatives to quit tobacco.

Children can act as anti-tobacco ambassadors'. Children exert a variety of pressure over their parents and relatives and they can make great differences in the quit tobacco movements. Anti-tobacco campaign focusing on the school children serves two purposes. First, we can prevent them falling prey to the strategies of the tobacco company. Secondly, children have great influence in their families and hence they can force their family members to quit. Considering all these facts, all tobacco control programs aimed at children will definitely have a tangible result. Many of the anti-tobacco programs are focused on cessation of the habit and policy changes at administrative levels. Very few programs are designed to prevent smoking and chewing tobacco. The target population for most of the preventive programs is students and programs focusing on them require more man power and longer duration. Very few studies have evaluated the success of the school tobacco intervention projects in India. Project MYTHRI assessed the effectiveness of a 2-year multi component, school-based intervention designed to reduce tobacco use rates among adolescents in an urban area of India. Project MYTRI was successful in reducing tobacco use, particularly cigarette smoking and bidi smoking, among adolescents in Delhi and Chennai over time (Perry et al., 2009). A recent study conducted by Jayakrishnanet al oncommunity based smoking cessation intervention in rural Kerala shows that intervention programmes using multiple approaches were found to be successful to increase the participation rate for intervention (Jayakrishnan et al., 2013).

The main limitation of the present study was a drop out of 18.5% students in the final evaluation due to student absence on the day of evaluation. Although the final evaluation dates were not announced in advance and the chances of tobacco users intentionally abstaining from the survey is less. Another limitation is that, as the students were self-reported their tobacco habits, at least some of them may not have revealed their tobacco use. But the chances for false reporting were less as confidentiality of the responses was guaranteed at the beginning of the study.

In conclusion, the comprehensive school based tobacco control project has significantly reduced the tobacco use pattern in the study population. School tobacco projects incorporating frequent follow ups and multiple interventions are more effective than projects with single intervention. Similar projects can be implemented in schools in other parts of the state and can reduce tobacco use significantly.

References

Azhar A, Alsayed N (2012). Prevalence of smoking among female medical students in Saudia Arabia. *Asian Pac J Cancer Prev*, **13**, 4245-8.

Armitage P, Berry G (1994). Statistical methods in medical research. Oxford: Blackwell Scientific Publication.

Campaign for Tobacco-Free Kids (2009). The path to smoking

Addiction Starts at Very Young Ages. Washington: Campaign for Tobacco-Free Kids.

Centers for Disease Control and Prevention (2002). Annual smoking-attributable mortality, years of potential life lost, and productivity losses—United States, 1995–1999. *Morbidity and Mortality Weekly Report*, **51**, 300-3.

Centers for Disease Control and Prevention (2003). Cigarette smoking attributable morbidity- US, 2000. *Morbidity and Mortality Weekly Report*, **52**, 842-4.

Centers for Disease Control and Prevention (2010). Tobacco use among middle and high school students- United States, 2000–2009. *Morbidity and Mortality Weekly Report*, **59**, 1063-8

Cleary PD, Hitchcock JL, Semmer N, Flinchbaugh LJ, Pinney JM (1998). Adolescent smoking: research and health policy. *Mil-bank Q*, **66**, 137-71.

GYTS 2009. Available at http://www.who.int/fctc/reporting/annexoneindia.pdf last accessed on January18, 2013

GATS 2010. Available at http://whoindia.org/en/Section20/Section25_1861.htm last accessed on January 18, 2013.

Jayakrishnan R, Geetha S, Binukumar B, Sreekumar, Lekshmi K (2011). Self-reported tobacco use, knowledge on tobacco legislation and tobacco hazards among adolescents in rural Kerala State. *Indian J Dent Res*, **22**, 195-9.

Jayakrishnan R, Mathew A, Uutela A, Auvinen A, Sebastian P (2013). Multiple approaches and participation rate for a community based smoking cessation intervention trial in Rural Kerala, India. *Asian Pac J Cancer Prev*, **14**, 2891-6.

Kandel DB, Yamaguchi K, Chen K (1992). Stages of progression in drug involvement from adolescence to adulthood: further evidence for the gateway theory. *J Stud Alcohol*, **53**, 447-57.

Odukoya OO, Odeyemi KA, Oyeyemi AS, Upadhyay RP (2013). Determinants of smoking initiation and susceptibility to future smoking among School-Going Adolescents in Lagos State, Nigeria. *Asian Pac J Cancer Prev*, **14**, 1747-53.

Perry CL, Stigler MH, Arora M, Reddy KS (2009). Preventing tobacco use among young people in India: project MYTHRI. *Am J Public Health*, **99**, 899-906.

Reddy KS, Gupta PC (2004). Report on Tobacco Control in India. Ministry of Health and Family Welfare, Government of India.

Reddy KS, Shah B, Varghese C, et al (2005). Responding to the threat of chronic diseases in India. *Lancet*, **366**, 1744-9.

Soldz S, Kreiner P, Clark TW, Krakow M (2000). Tobacco use among Massachusetts youth: is tobacco control working? *Prev Med*, **31**, 287-95.

US Department of Health and Human Services (1994). Preventing Tobacco Use among Young People: A Report of the Surgeon General. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Office on Smoking and Health.

US Department of Health and Human Services (2000).Reducing Tobacco Use: A Report of the Surgeon General. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion Office on Smoking and Health, [accessed 2012 Feb 14].

WHO (2008). WHO report on global tobacco epidemic (2008), The MPOWER package.

www.who.int/tobacco/mpower/mpower_report_full_2008.pdf[accessed on 12-12-12]