
RESEARCH COMMUNICATION

Factors Influencing Smoking Behavior Among Adolescents

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Abstract

Objective—To study the impact of tobacco advertisements and other social factors on the smoking habits of adolescents in Calcutta, India.

Design — Cross sectional, school based survey of students in the IXth and XIth grades. The responses were analyzed by binary logistic regression.

Participants— High School students in Calcutta aged 14 to 18 years.

Main Outcome Measure — Smoking Status as defined by ever smokers of tobacco products.

Results— 1973 students were interviewed (males-73.79% and females-26.21%). Increased tobacco use was associated with older age-groups, male gender, government-run schools, having parents or peers who were smokers, and if the respondent was also a chewer. The likelihood of a respondent being a smoker was 8.5 times greater (95% CI: 5.05-14.43) if he or she had a smoker friend, and about 4.5 times (95% CI: 2.7-7.4) if he or she had a smoker sibling. In the multivariate model, the parents' smoking status did not have a statistically significant association with respondent's smoking status. Television advertisements of tobacco products had no statistically significant association with respondents' smoking status.

Conclusions— The finding of tobacco advertisements not having a significant association with smoking habits among adolescents could be due to the fact that, at the time of this survey, tobacco advertisements were not frequent in the prime channels due to Government regulations. Peer influence had the strongest association with adolescent smoking. It is therefore suggested that the peer influence factor should be considered for anti-tobacco regulatory activities that target adolescent smoking in India.

Keywords: smoking - adolescents - schools -peer influence

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Introduction

Tobacco related cancers account for approximately 43% of all cancers for males and 12 % of all cancers for females in Calcutta (CNCI, 1997). Recent trends in tobacco smoking indicate that prevalence among the adolescents is increasing and the age at which they initiate smoking tobacco is becoming younger. Since tobacco is a source of nicotine addiction, adolescent tobacco users are also more likely to become adult tobacco users (Aloise-Young 1994, Biglan 1995, Botvin et al 1993, Brynin 1999). For this reason, adolescents are increasingly being targeted for tobacco-prevention activities.

Evidence on the determinants of adolescent smoking reveal that immediate social circumstances, parental smoking (Dapper et al 1996, DiStefan 1998) having a smoker sibling and peer smoking are significantly associated with an adolescent being a smoker (Evans 1995, Gilpin 1997, Gilpin 1997a, Pierce 1998). Exposure to cigarette advertisements in television has also been shown to be influential. However, relatively few studies have statistically controlled for the roles of both media exposure to tobacco advertisements and social circumstances (Unger 1999, Palmer 1994). This study was undertaken to find out if similar factors that are responsible for adolescent smoking in the developed countries also operate in the developing countries as well.

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In India, where tobacco related morbidity & mortality is high in the eastern region, no study on the determinants of adolescent tobacco use is available. Therefore, a survey was conducted by the Chittaranjan National Cancer Institute in Calcutta, India to study the prevalence tobacco use and influence of other known related factors among the high school students in Calcutta, a large metropolitan city in Eastern India.

Using information from this survey, we report the impact of tobacco advertisements and other social factors on the smoking habits of adolescents in Calcutta.

Methods

Participants

The students were selected from High schools by Simple Random Sampling. Altogether 25 schools were selected in Calcutta Metropolitan area. Out of these, 21 schools (84%) responded. In each school two grades (a.k.a. classes in India) were selected (grades IX and XI). The survey was conducted between September, 1998 and January, 1999.

The staff members of Epidemiology & Bio-statistics Department of Chittaranjan National Cancer Institute distributed the survey instrument. It was a self-administered pre-tested questionnaire containing 51 close and open-ended items. The students answered the items using paper and pencils. The answers were coded and entered into a database for further analysis.

Plan of Analysis

Independent variables

Age in years, sex, type of school (government-administered or privately owned), types of products advertised on television, smoking status of friends, siblings and parents, and whether the subjects chewed tobacco, either alone or in combination with smoking. The age variable was further categorized into four groups. The variables smoking by friends and siblings were combined to create a new variable labeled 'peer smoking'. No student had a sister who smoked. Hence, sibling smoking status for this paper indicates whether a brother was a smoker. Peers were labeled as nonsmokers only where neither brothers nor friends

Table 1. Distribution of Independent and Outcome Variables by Gender

Variables	Category	Males	Females	Significance
Age in Years	Less than 14	295 (20.27)	99 (19.15)	0.65
	14 - 15	361 (24.79)	121 (23.41)	
	16 - 17	729 (50.07)	265 (51.26)	
	18 and above	71 (4.87)	32 (6.18)	
School Type	Government	591 (40.59)	218 (42.16)	0.28
	Private	865 (59.41)	299 (57.84)	
Parents Smoking Status	Non-smokers	816 (56.27)	326 (63.05)	<0.01
	Smokers	634 (43.73)	191 (36.95)	
Friends' smoking status	Non-smokers	466 (32.04)	380 (26.13)	<0.01
	Smokers	988 (67.96)	134 (73.87)	
Sibling smoking status	Non-smokers	1009 (71.66)	373 (72.70)	0.35
	Smokers	399 (28.34)	140 (27.30)	
Chewer Status	Non-chewers	1293 (91.60)	490 (98.00)	<0.01
	Chewers	118 (8.40)	10 (2.00)	
Advertisement remembered	Unspecified	770 (52.89)	248 (47.97)	<0.01
	Soft Drinks	456 (31.33)	213 (41.19)	
	Tobacco Products	126 (8.65)	35 (6.77)	
	Alcoholic Drinks	27 (1.85)	0	
	Consumer Items	30 (2.06)	10 (1.94)	
	Snacks	19 (1.30)	8 (1.54)	
	Automotive	15 (1.03)	0	
	Miscellaneous	13 (0.89)	3 (0.59)	
Smoking Status	Nonsmokers	1191 (81.79)	496 (95.93)	<0.01
	Smokers	265 (18.21)	21 (4.07)	
Total		1456 (100.0)	517 (100.0)	

Table 2. Bivariate Distribution of Select Key Independent Variables with Reference to Being a Smoker

Variables	Category	Smokers	Percentage	Significance
Age Group				<0.01
	Less than 14	24	6.1	
	14 - 15	57	11.4	
	16 - 17	175	17.6	
	18 and above	30	29.1	
Gender				<0.01
	Males	265	18.2	
	Females	21	4.1	
School Type				<0.01
	Government	141	17.4	
	Private	145	12.5	
Parents' Smoking Status				<0.01
	Non-smokers	133	11.6	
	Smokers	153	18.5	
Peers' Smoking Status				<0.01
	Non-smokers	21	3.0	
	Brother Smoker	138	17.1	
	Friend Smoker	119	29.4	
Chewing Status				<0.01
	Non-chewer	235	13.2	
	Chewer	46	35.9	
Advertisement remembered				0.56
	Unspecified	159	15.6	
	Soft Drinks	82	12.3	
	Tobacco Products	24	14.9	
	Alcoholic Drinks	6	22.2	
	Consumer Items	5	12.5	
	Snacks	5	18.5	
	Automotive	2	13.3	
	Miscellaneous	3	18.8	

smoked. Otherwise, peer was a smoker if either brother or a friend smoked.

Main Outcome Measure

Smoking Status of the respondent was the outcome variable. This was determined by answer to the question whether the students ever smoked. If the student answered 'yes', he or she was labeled as a smoker.

Univariate statistics

Frequency distributions were reported for all independent and outcome variables by gender.

Bivariate statistics.

Cross-tabulations were reported for all independent variables with the smoking status. The statistical significance was determined by chi-square tests. The significance level was fixed at $\alpha = 0.05$

Multivariate statistics

All statistically significant independent variables from the

bivariate distribution were then entered into a binary logistic regression model. They were regressed on the smoking status (with smokers=1) as the outcome variable. Based on this logistic regression model, the strength of association between the independent and outcome variables was determined by the odds' ratio (with 95% Confidence Interval). The level of significance was kept at $\alpha = 0.05$

Results

Out of 2349 students initially selected for the survey, 1973 (83.4 percent) students responded to the survey. Males and females were comparable with respect to age distribution and the type of schools attended. Among smokers and chewers of tobacco, proportion of males were significantly higher. A higher proportion of males reported that their parents and friends smoked cigarettes. No statistically significant difference was found in the proportion of males and females who reported about their siblings as cigarette smokers. Besides, the recall of tobacco advertisements were higher for male students. (Table 1)

Increased use of tobacco (smoking and chewing) was associated with older age, male gender, schooling in government run schools, having parents or peers who were also smokers, and if the respondent also was a chewer. About 30% of the respondents who reported they knew a friend who smoked, were smokers themselves. About 36% of chewers were smokers. Smokers were also more likely to report their parents and peers to be smokers. (Table 2).

After controlling for the effects of all other factors, having a smoker friend had the strongest association with a respondent being a smoker. The odds for students being smokers were about 8.5 times (95% CI: 5.05-14.43) for those who had smoker friends than those who did not have smoker friends. For a student who had a smoker sibling, the odds for being a smoker were 4.5 times (95% CI: 2.7-7.4) compared to those who did not have a smoker sibling. After controlling for the effects of all other factors, having a smoker parent had no statistically significant association with the respondent being a smoker. Furthermore, based on the recall of various advertised products in television, remembering tobacco-related products did not have any statistically significant association with smoking (Table 3).

Discussion

This survey has confirmed earlier findings by other investigators that peer smoking is significantly associated with adolescent smoking. Presence of a peer smoker (peer smoker was defined as either a friend or a sibling being a smoker) had the strongest association with smoking. After controlling for all other factors, males were 3.5 times more likely to be smokers compared to females. A peer personality

(friend or a sibling) being a smoker was found to have the strongest factor of 8.5 times associated with smoking. It has been shown by some other groups also that friend’s smoking status affects adolescents initiation into smoking both directly and indirectly, while parental smoking influences smoking initiation only indirectly (Flay 1994, Wang et al. 1995). In our study, we observed that the percentage of smokers was higher among the students whose parents also smoked. However, we did not find any statistically significant association between parental smoking and the likelihood of the student being an ever-smoker in the multivariate analysis. Several earlier studies have suggested an important role of the media (television advertisements in particular) on an adolescent being a smoker (Evans, 1995). Thus, the competing hypothesis that the effects of peer influence on smoking was possibly confounded by the effects of media on smokers was evaluated in the present survey. Analysis of the effects of television advertisements revealed that tobacco specific advertisements did not have a significant effect on smoking in general. Additionally, when asked to identify the most remembered advertised products watched on television, only 8.65 % of the total respondents could remember tobacco related products. However, among the smokers this percentage was 14.9. Even among the peers, the effect of a friend being a smoker was found to have a stronger effect on smoking than that of a brother or sister being a smoker. We further investigated the interaction between parental smoking and peer smoking status but in this case no statistically significant effect was observed.

This is the first such study conducted in Eastern India. A possible explanation of the tobacco advertisements not having any significant association with the smoking habits

Table 3. Multivariate Logistic Regression Modeling Smoking Status with Key Independent Variables

Variables	Categories	Odds Ratio	95 percent C.I.	p-value
Age Groups	Less than 14	Reference		<0.01
	15-16 years	1.78	1.04 - 3.03	
	17 - 18 years	2.38	1.48 - 3.84	
	Above 18	4.65	2.39 - 9.02	
Gender	Female	Reference		<0.01
	Males	3.45	2.08 - 5.88	
Type of School	Private	Reference		0.05
	Government	1.32	0.99 - 1.75	
Parents’ Smoking Status	Non-smokers	Reference		0.15
	Smoker	1.23	0.92 - 1.63	
Peers’ Smoking Status	Non-smokers	Reference		<0.01
	Sibling Smokes	4.47	2.69 - 7.42	
	Friend Smokes	8.54	5.05-14.43	
Chewing Status	Nonchewers	Reference		<0.01
	Chewers	2.40	1.56 - 3.68	

of this age groups could be that, at the time of the survey, tobacco advertisements were not frequently shown in the prime channels due to Government regulations. In our future studies this will be further investigated. However, peer influence clearly plays a very significant role in adolescent smoking. So on the basis of our findings we suggest that while planning any anti tobacco regulatory approach or activities directed at adolescent smoking, the issue of peer influence should be considered.

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References

- Population Based Cancer Registry. A report on the cancer incidence patterns of Calcutta. Chittaranjan National Cancer Institute, 1997: 19-20.
- Aloise-Young PA, Graham JW, Hansen WB (1994). Peer influence on smoking initiation during early adolescence: a comparison of group members and group outsiders. *J Appl Psychol*, **79**, 281-7.
- Biglan A, Duncan TE, Ary DV, Smolkowski K (1995). Peer and parental influences on adolescent tobacco use. *J Behavioral Med*, **18**, 315-30.
- Botvin GJ, Baker E, Botvin EM, et al (1993). Factors promoting cigarette smoking among black youth: a causal modeling approach. *Addictive Behav*, **18**, 397-405.
- Brynin M (1999). Smoking behaviour: predisposition or adaptation? *J Adolesc*, **22**, 635-46.
- Dappen A, Schwartz RH, O'Donnell R (1996). A survey of adolescent smoking patterns. *J Amer Board Fam Pract*, **9**:7-13.
- Distefan JM, Gilpin EA, Choi WS, Pierce JP (1998). Parental influences predict adolescent smoking in the United States, 1989-1993. *J Adolesc Hlth*, **22**, 466-74.
- Evans N, Farkas A, Gilpin E, Berry C, Pierce JP (1995). Influence of tobacco marketing and exposure to smokers on adolescent susceptibility to smoking. *J Natl Cancer Inst*, **87**, 1538-45.
- Flay BR, Hu FB, Siddiqui O, et al (1994). Differential influence of parental smoking and friends' smoking on adolescent initiation and escalation of smoking. *J Hlth & Social Behav*, **35**, 248-65.
- Gilpin EA, Pierce JP, Rosbrook B (1997). Are adolescents receptive to current sales promotion practices of the tobacco industry? *Prev Med*, **26**, 14-21.
- Gilpin EA, Pierce JP (1997). Trends in adolescent smoking initiation in the United States: is tobacco marketing an influence? *Tobacco Control*, **6**, 122-7.
- Palmer RF, Dwyer JH, Semmer N (1994). A measurement model of adolescent smoking. *Addictive Behav*, **19**, 477-89.
- Pierce JP, Choi WS, Gilpin EA, Farkas AJ, Berry CC (1998). Tobacco industry promotion of cigarettes and adolescent smoking. *JAMA*, **279**, 511-5.
- Population Based Cancer Registry Report, CNCI, Calcutta. 1997.
- Unger JB, Chen X (1999). The role of social networks and media receptivity in predicting age of smoking initiation: a proportional hazards model of risk and protective factors. *Addictive Behav*, **24**, 371-81.
- Wang MQ, Fitzhugh EC, Westerfield RC, Eddy JM (1995). Family and peer influences on smoking behavior among American adolescents: an age trend. *J Adolesc Hlth*, **16**, 200-3.

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Tobacco Survey with WHO collaboration. At present working in projects on retrospective analysis of tobacco related causes of death and the role of tobacco in a case control study of lung and laryngeal cancers.