CORRELATES OF TOBACCO-USE PATTERN AMONGST ADOLESCENTS IN TWO SCHOOLS OF NEW DELHI, INDIA

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ABSTRACT

BACKGROUND: As adolescent tobacco use has been found to be a major predictor of future use, preventive efforts need to be focused on this section of population. OBJECTIVES: To assess the role of knowledge regarding tobacco, risk-taking attitude, peers, and other influencers on tobacco and areca nut use, amongst adolescents. SETTINGS AND DESIGN: A school-based cross-sectional study covering two schools. Students of classes IX and XI, of selected schools, participated in the study (n = 596). METHODS: A pretested and validated, close ended, self-administered questionnaire was used. Sociodemographic factors, awareness regarding tobacco, risk-taking attitudes, role of peers and other influencers, and tobacco, areca nut and alcohol use, were studied. STATISTICAL ANALYSIS: Point estimates, 98% Confidence Intervals, tests of significance, bivariate and multivariate analysis (multiple logistic regression). RESULTS: Almost 42% of tobacco users started before the age of 12 years. Peer pressure, general stress, and media were important influencers. Logistic regression analysis showed that students in public school were using more tobacco [Odds ratio (OR) = 1.85, P = 0.174] and tobacco/areca nut (OR = 1.14, P = 0.02). The difference in use between the genders and class in which studying was statistically not significant. Lesser proportion of those possessing adequate knowledge regarding tobacco used it as compared to those without adequate knowledge (OR = 0.13, P < 0.001) however, possession of adequate knowledge was not a good predictor of areca nut consumption (OR = 0.86, P = 0.585). The most important correlate for tobacco use (OR = 6.41, P < 0.001) and areca nut use (OR = 11.17, P < 0.001) was risk-taking attitude. CONCLUSION: Multipronged and concerted efforts targeting children at an early age are required to prevent tobacco and areca nut use among adolescents.

KEY WORDS: Adolescents, areca nut use, influencers, risk-taking attitude, tobacco use

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INTRODUCTION

As per recent estimates the number of deaths due to tobacco will increase from 3 million per year worldwide to 70 million per year by 2025 and a large section of that increase will be in developing countries.[1] In India, out of more than 2.2 million cancer patients, tobacco related cancers account for half the total cancers among men and 20% among women and about 0.7 million tobacco related deaths occur each year. Though these rates are lower than US they still are a major public health concern.[2],[3]

At present the focal point of the tobacco epidemic is in the developing countries, where tobacco use rates are increasing particularly among women and youth.[4] As per the National Sample Survey of India (1993–1994),[5] 29.3% of rural and 20.2% of urban males, 2.3% of rural, and 0.7% of urban females smoked bidis[a] and cigarettes. The prevalence of tobacco consumption in other forms such as snuff, chewing tobacco, burnt tobacco powder, and paste was 19.3 and 9.9% in rural and urban males, respectively, 9.3 and 4.3% in rural and urban females, respectively.[6] As per WHO estimates, approximately 80% of adult smokers initiate their tobacco use before 18 years of age.[7]

It is estimated that like in other developing countries, the most susceptible time for initiating tobacco use in India is adolescence and early adulthood. Approximately 55 500 adolescents start using tobacco every day in India, joining the 7.7 million young people under the age of 15 who already regularly use tobacco.[8] Global Youth Tobacco Survey (GYTS)[9] showed that 10 percent had ever used tobacco in any form. The proportion of students currently using any tobacco products was 4.5% (boys: 5.5%; girls: 3.1%). Although the GYTS project provided the prevalence figures, it did not delve into the predictors of such behavior. According to another study among Delhi students aged 11–14 years, 9.3% of students reported having experimented with smoking, in the absence of any intervention programme.[10] A study from Mangalore amongst students showed prevalence of smoking to be 33.1% with a higher proportion of smokers chewed pan and consumed supari.[11]

This experimentation with tobacco use during adolescence commonly leads to dependence and chronic disease.[12] As adolescence is the most susceptible time for initiation of tobacco use and adolescent tobacco smoking has been found to be a major predictor of adult smoking, preventing this use requires intervention in early adolescence prior to the time when these behaviors have already become ingrained.[13] Lack of adequate information to from a basis of effective preventive strategies, prompted us to conduct this study with the objective of studying the correlates of tobacco use amongst school going adolescents in New Delhi (South District). The ultimate aim of the study was to provide information to planners and program managers in designing an appropriate preventive strategy.

MATERIAL AND METHODS

A school-based cross-sectional study was carried out covering two dissimilar schools (Government and Public) in the Southern part of New Delhi, India. Students of classes IX and XI, of selected schools, participated in the study (n = 596). Separate lists of all government and private (wholly private or aided) coeducational schools in South Delhi were made and one school out of each list was picked up by random number generation by a computer. These schools were approached for

conducting the study. Departmental clearances were obtained by schools and informed consent of the school authorities and class teachers was obtained before the administration of a pretested and validated, close ended, self administered, anonymous questionnaire. A copy of objectives of the study and domains was forwarded to parents of the children for their assent.

The study instrument had been prepared after a detailed literature search and perusal of questionnaires used in prior studies. The variables included pertained to: knowledge about tobacco (harmful effects, addiction, link with diseases, forms of tobacco available); risk-taking attitude (willingness to smoke if situation arises or to impress peers); role of peers (social network, acceptance among friends); their own practices (smoking, smokeless tobacco); reasons and influencers for their habit (role of general stress, societal pressure, peer pressure, friends, parents, and relatives, advertisements on TV and print media); attempts and methods adopted for quitting. The instrument also had one query on alcohol consumption. The study instrument was pretested in 50 students (25 each from standards IX and XI) from a different school.

The sample size (650 including 10% refusals) had 80% power to detect a difference of 10% between groups/schools/categories with a 0.050 2-sided significance level. The sample size was also adequate for regression analysis for measuring small effect size.

The total number of students in both the schools (in standards IX and XI) was 810. Simple random sampling method was used to select 650 children out of 810. Data were collected in the year 2002–2003 in a classroom situation. Issues like, voluntary nature of participation, withdrawal at any point of time and unlinked anonymous data collection were explained to all participants. The refusal rate was 4.46%, the general characteristics of those who refused did not differ from those who participated ($P > 0.05$). No time limit was given to fill up the questionnaire, but on an average, students took 30–40 min to answer all the questions. A total of 25 (4.03%) questionnaires were later not included, due to more than 10% unanswered questions. Thus our final sample size worked out to be 596, giving an overall response rate of 91.69%.

A database was created in MS Access and after appropriate cleaning; analysis was performed using SPSS Ver 11.0.1. Appropriate descriptive statistics like proportions and confidence intervals (CIs) were calculated. 98% CIs were calculated to cater for the variance due to the cluster design. Statistical tests of significance, like chi-square (with corrections) and Odds ratios were used wherever required and models were made using multiple logistic regressions.

Three composite variables: knowledge about tobacco, risk-taking attitude, and peer pressure were generated. All the variables pertaining to awareness regarding various aspects of tobacco (harmful effects on health including minor and major illnesses and other health conditions, addictive nature, effects of secondary smoke, benefits of nonconsumption, promoters of use) were combined to generate a variable of *knowledge*

about tobacco (Chronbach a = 0.61). *Risk-taking attitude* was generated from all variables measuring attitudes towards tobacco consumption including hypothetical situations (try to gain acceptance, try on being offered, try to just see the effect, association with glamour; Chronbach = 0.57). *Peer pressure* was generated after combining variables pertaining to influence of friends on: tobacco use, general behavior, clothes, and style statements (Chronbach a = 0.65).

After bivariate analysis, variables showing statistically significant associations with the study outcomes were used in logistic regression models. The models were made step-wise with inclusion of variables increasing R^2 and dropping of those that reduced it significantly. Alcohol use was not used for these models, as study design did not permit analysis of which came first, alcohol use or tobacco use.

RESULTS

In Table 1, bivariate analysis shows a statistically significant difference in the knowledge between schools and both sexes. The government school children were more aware than private school children. This lack of knowledge among private school students was also reflected by a higher prevalence of risk-taking attitude amongst them. Both the standards (IX and XI) were similar in knowledge base, however a higher proportion of class XI students showed risk-taking attitude as compared to class IX. It also shows that higher age group students, males and private school students believed more in peer pressure and were offered tobacco as

compared to their respective counterparts. Table 2 shows that of the 72 students (12.08%) who ever smoked, 29.17% smoked less than 5 years, 54.17% smoked occasionally, 2.98% more than 5 years, and 13.89% used to smoke earlier. A total of 16.28% students smoked cigarettes and/or consumed smokeless tobacco (gutkha) either singly or in combination with each other. Another observation was the high prevalence of areca nut consumption in 11.74% of students. A total of 21.31% students were found to be consuming tobacco in some form or the other or were at risk of oral health disorders due to areca nut use. Though statistically significant higher tobacco consumption was observed in males as compared to females, the overall consumption of tobacco and areca nut was almost similar in both the sexes. The table also shows that 9.23% students were either consuming or had earlier consumed alcohol. Of these, 83.63% were currently consuming alcohol and the rest had discontinued the consumption.

Bivariate analysis showed that Odds of consuming tobacco (smoking), tobacco (any form) and tobacco and/or areca nut were 16.91 (5.06–68.13), 13.30 (4.59–43.46), and 2.18 (1.37–3.49), respectively, amongst students having inadequate knowledge about tobacco as compared to those having adequate knowledge. Similar comparison between those with risk-taking attitude and those without showed Odds of 89.35 (39.98–204.94), 71.52 (34.10–152.71), and 13.01 (7.70–22.05).

Tables 3 and 4 show the reasons and influencers of starting/continuing tobacco and/or areca nut use. The most common reason

Table 1: Details of study participants and proportion of students who: believed in peer pressure having an effect on tobacco consumption, were ever offered tobacco, were possessing correct knowledge about tobacco, and were found to be having risk-taking attitude (*n* = 596)

Distribution of study participants	Study participants' totals in each category, n (%)	Those believing in peer pressure (%)	Those ever offered tobacco (%)	Those possessing correct knowledge about tobacco (%)	Those having risk-taking attitude (%)
Age (years)					
£14	246 (41.28)	6.50	10.98	41.06	9.76
15–17	350 (58.72)	20.29	38.57	35.43	20.57
P value *		<0.001	<0.001	0.163	<0.001
Gender					
Female	269 (45.13)	9.66	17.10	50.19	9.67
Male	327 (54.87)	18.65	35.47	27.52	21.41
P value *		0.002	<0.001	<0.001	<0.001
Class in which studying					
IX	259 (43.46)	6.95	13.90	39.38	10.42
XI	337 (56.54)	20.47	37.39	36.50	20.47
P value *		<0.001	<0.001	0.472	0.001
School					
Government	292 (49.00)	4.45	19.52	46.23	7.19
Private	304 (51.00)	24.34	34.54	29.61	24.67
P value *		<0.001	<0.001	<0.001	<0.001
Total	596 (100%)	14.60 (11.39–18.28)†	27.18 (23.02–31.65)†	37.35 (33.14–42.53)†	16.11 (12.76–19.92)†

* Chi-square test of proportions, two tailed, † 98% Confidence Interval.

Table 2: Details of proportion of students who: ever smoked tobacco, ever used tobacco in any form, ever used tobacco and/or areca nut, and ever used alcohol (n = 596)

Distribution of study participants	Study participants' totals in each category, n (%)	Tobacco use (smoking) (%)	Tobacco use smoking and/or (smokeless) (%)	Tobacco use (any form) and/or areca nut use (%)	Alcohol use (ever) (%)
Age (years)					
£14	246 (41.28)	3.66	3.66	12.20	2.44
15–17	350 (58.72)	18.00	25.14	27.71	14.00
P value *		<0.001	<0.001	<0.001	<0.001
Gender					
Female	269 (45.13)	8.18	10.78	19.33	8.55
Male	327 (54.87)	15.29	20.80	22.94	9.79
P value *		0.008	<0.001	0.285	0.604
Class in which studying					
IX	259 (43.46)	4.25	5.02	12.74	2.32
XI	337 (56.54)	18.10	24.93	27.89	14.54
P value *		<0.001	<0.001	<0.001	<0.001
School					
Government	292 (49.00)	5.48	7.88	15.75	1.37
Private	304 (51.00)	18.42	24.34	26.64	16.78
P value *		<0.001	<0.001	0.001	<0.001
Total	596 (100%)	12.08 (9.15–15.53)†	16.28 (12.91–20.10)†	21.31 (17.53–25.48)†	9.23 (6.67–12.35)†

* Chi-square test of proportions, two tailed, † 98% Confidence Interval.

Table 3: Common reasons given by users for initiation/continued use of tobacco in any form and/or areca nut (*n* = 127)

Reasons†	General stress	Academic pressure	Peer pressure	Glorified advertisements
Age (years)				
£14	23.33	3.33	86.67	23.33
15–17	39.18	23.71	82.47	48.45
P value *	0.113	0.013	0.589	0.015
Gender				
Female	28.85	19.23	90.38	38.46
Male	40.00	18.67	78.67	45.33
P value *	0.196	0.936	0.081	0.441
Class in which studying				
IX	24.24	3.03	81.82	30.30
XI	39.36	24.47	84.94	46.81
P value *	0.118	0.007	0.767	0.099
School				
Government	31.11	6.67	95.56	31.11
Private	37.80	25.61	76.83	48.78
P value *	0.451	0.009	0.007	0.054
Total answering in affirmative, n (%)	45 (35.43)	24 (18.90)	106 (83.46)	54 (42.52)

* Chi-square test of proportions, two tailed, † Multiple responses.

Table 4: Common influencers, as mentioned by users, for initiation/continued use of tobacco in any form and/or areca nut (*n* = 127)

	Parents and relatives (%)	Friends (%)	Advertisements on TV (%)	Advertisements in print media (%)	Other reasons (%)
Age (years)					
£14	0.00	80.00	6.67	23.33	20.00
15–17	17.53	56.70	17.53	44.33	23.71
P value *	0.012 ‡	0.021	0.240 ‡	0.040	0.672
Gender					
Female	9.62	73.08	9.62	36.54	11.54
Male	16.00	54.67	18.67	41.33	30.67
P value *	0.299	0.035	0.160	0.587	0.012
Class in which studying					
IX	3.03	75.76	12.12	30.30	27.27
XI	17.02	57.45	15.96	42.55	21.28
P value *	0.070 ‡	0.062	0.779 ‡	0.215	0.480
School					
Government	2.22	77.78	11.11	28.89	11.11
Private	19.51	53.66	17.07	45.12	29.27
P value *	0.006	0.007	0.368	0.073	0.020
Total answering in affirmative, n (%)	17 (13.39)	79 (62.20)	19 (14.96)	50 (39.37)	29 (22.83)

* Chi-square test of proportions, † Multiple responses, ‡ Fisher exact 2-tailed P value.

put forth by users was peer pressure, followed by advertisements, general stress, and academic pressure. The academic pressure was more amongst private school students whereas peer pressure was more amongst government school students. The role of friends was the most important influencer in tobacco use amongst our study participants, followed by print media and television. Parents and close relatives as influencers were important for higher age groups and private school children.

Multivariate analysis (logistic regression) results are shown in Table 5. In these models, role of school environment, gender, class in which studying, age, knowledge about tobacco and risk-taking attitude was assessed on the use of tobacco in any form and/or areca nut use. This was done separately for each of the outcomes. Table 5 depicts that Odds of private school males of higher age group consuming all forms of tobacco and areca nut were higher, whereas Odds were higher for females consuming areca nut, as compared to all other categories. The table also shows that student with less knowledge and higher risk-taking attitude, used tobacco and areca nut more than others. As shown in all the models, knowledge about tobacco was not a good predictor of areca nut consumption.

Table 5: Results of multivariate analysis (logistic regression) showing Odds ratios regarding study outcomes: consumption of tobacco (smoking/smokeless/any form), and consumption of tobacco and/or areca nut

	Tobacco use (smoking) (OR and P value)*	Tobacco use (smoking and/or smokeless) (OR and P value)*	Tobacco and/or areca nut use Odds (OR and P value)*
School			
Government	1.00	1.00	1.00
Private	1.562 (0.345)	1.847 (0.174)	1.135 (0.020)
Standard			
IX	1.00	1.00	1.00
XI	2.853 (0.344)	1.106 (0.912)	1.582 (0.586)
Gender			
Female	1.00	1.00	1.00
Male	1.206 (0.699)	1.491 (0.383)	0.950 (0.845)
Age (years)			
£14	1.00	1.00	1.00
15–17	3.026 (0.331)	8.565 (0.048)	1.503 (0.606)
Knowledge about tobacco			
No	1.00	1.00	1.00
Yes	0.094 (0.001)	0.133 (<0.001)	0.864 (0.585)
Risk-taking attitude			
No	1.00	1.00	1.00
Yes	6.410 (<0.001)	49.917 (<0.001)	11.171 (<0.001)

* OR – Odds ratio.

Figure in parenthesis indicate *P* value.

Values in each column indicate Odds of using tobacco (smoking/smokeless/areca nut) amongst students of different: schools, standards, gender, age groups, knowledge groups, and risk-taking attitude.

DISCUSSION

Adolescent tobacco use is a complex behavior. The importance of predictors of smoking onset, like social bonding, social learning, refusal skills, knowledge, risk-taking attitudes, and intentions have been highlighted in studies in developed countries.[14] One study in the US, found that the most powerful predictors of transition to smoking were alcohol, marijuana, and other drugs, involvement with violence, learning problems, a history of sexual intercourse, frequent hanging out with friends and having friends who smoke.[15]

Bonding with friends is an important part of adolescent development. The impact of peers on regular smoking is greater than that of parents and siblings.[16] Another study conducted in Scotland among youths, aged 15–21 years, likewise found that friends had larger influence on smoking than did parents or siblings.[17] That study also found that the influence of friends extends beyond adolescence into early adulthood. Our findings are in consonance with these studies.

The positive representation of smoking in the media is a potential problem for health promotion. Adolescents are very image conscious and are receptive to the portrayal of power and angst shown by the media. Other researchers while studying adolescent tobacco use have corroborated our study results of the immense influence of media advertising.[18]–[20]

The early age for experimentation and initiation of tobacco use among adolescents in our study is approximately the same as that in the USA. As per US data, the age distribution for committed never smokers and current established smokers suggests that smoking uptake is as early as age 10 years, and appears to have begun in most future smokers by age 14 years. Further, by age 19 years, most people who will become established smokers appear to have already done so. Fourteen years of age appeared to be a threshold for young people to become current established smokers.[21] This is comparable to the mean age of 14.8 years for cigarette smoking onset in a South African study.[22]

Though many studies have shown lower socioeconomic group children as consuming more tobacco, our study found the reverse with significantly higher consumption of tobacco amongst children of private school (higher socioeconomic group) as compared to government school. This needs to be studied further. However the difference was not statistically significant for areca nut use.

Regression models of our study show that male students of private school, in higher age groups with inadequate knowledge and having a risk-taking attitude were at a significant risk of using tobacco in any form. The association of areca nut consumption with knowledge and gender was not statistically significant. This has an important implication on public health policy, as commercial preparations of areca nut with/without tobacco are being marketed aggressively in our country with advertisements like, '0% tobacco and 100% taste.'

The statistically significant association, found

in our study, of tobacco use in any form, lack of knowledge and risk-taking attitude, is in conformity with predictors identified by various studies. Our study also found a statistically significant association of consumption of any form of tobacco and areca nut with risk-taking attitude and alcohol use. A study in France also found independent positive association between smoking and alcohol consumption.[23] Despite this association, we did not use alcohol consumption in multivariate analysis, as it is difficult to ascribe causality to alcohol use for tobacco use.

Hypothetically, a cognitive-based intervention, with a focus on social influences related to tobacco use, should affect knowledge and behavioral variables and influence personal cessation efforts. However, it has been found that knowledge is not always related to tobacco use in the hypothesized direction. We thus hypothesize that knowledge-based cessation programming alone, may not produce desired behavioral effects. Peer network influences are powerful in the tobacco use process, more prevalent the tobacco use and peer network, the greater the prediction of use. Our data supports the comments of Simons-Morton, Greene and Gottlieb who noted that 'knowledge is necessary but not sufficient' to achieve behavior change.[24] To continue using interventions that are solely knowledge based would seem to be contraindicated by the evidence, yet it seems a popular method of health education intervention for young and old alike.

The information on parents' occupation and income was not elicited in the questionnaire as results of the pilot showed increased apprehension among students regarding loss of confidentiality by answering these questions. Only two schools, one public and one private of South Delhi were studied. This may not be considered representative of entire Delhi. However, the study design and scientific rigor adopted gave us internal validity in this study.

Conclusions and recommendations

A longitudinal study would lead to a better understanding of the predictors of continued tobacco consumption among adolescents. School-based interventions on tobacco use cessation have to include other drugs like alcohol and have to start early as around 40% started their habits before the age of 12 years. The effectiveness of a well-designed planned and concerted intervention has already been shown in an intervention trial in few schools of Delhi.[12]

ACKNOWLEDGMENTS

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