RESEARCH ARTICLE

Factors Associated with Tobacco Use in Students Attending Local Government Schools in Mumbai, India

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Abstract

Purpose: Factors associated with ever-use and differences between ever-users and non-users of tobacco among adolescent school students from low income families in Mumbai were assessed. **Materials and Methods:** A self-administered questionnaire, completed by 1918 students from grades 7, 8 and 9 in 12 schools managed by the city municipal corporation in July 2015, gathered data on socio-demographic characteristics, tobacco use and tobacco-related knowledge, attitudes and beliefs. **Results:** Although only 1% of respondents thought tobacco was cool, nearly 35% were unaware of associations between tobacco use and health problems. Male students were almost twice as likely (OR=2.5, P <= 0.05) to have ever used tobacco compared to females and Supari (areca nut) users were eight times more likely (OR=8.99, P < 0.001) than Supari non -users. Tobacco-users were more likely to agree with statements: 'People who use tobacco have more friends' (OR=2.8, P = 0.004), 'Smoking relieves stress' (OR=5.6, P = 0.002) and 'It is possible to purchase any tobacco product within 100 yards of school' (OR=10.8, P < 0.001). **Conclusion:** This study highlights the gains made by tobacco prevention campaigns in that almost all students did not consider tobacco as cool or a stress reliever. However, they still need education about health consequences of tobacco-use. In addition, Supa**ri** use has to be addressed in school-based tobacco prevention and cessation initiatives. Furthermore, programs must also address perceptions and norms related to peers and tobacco use and ensure active implementation of existing laws. Such integrated measures will help ensure tobacco-free spaces around schools.

Keywords: Tobacco use- adolescents- Mumbai- India

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Introduction

With nearly 274 million adult users India has the second largest proportion of tobacco users in the world after China (Giovino et al., 2012; MoHFW, 2010). An estimated five million children are addicted to tobacco; and every day more than 5,500 children under the age of 15 try tobacco for the first time (Reddy and Gupta, 2004). Almost 4 in 10 tobacco users in India start before the age of 18 years (MoHFW, 2010), which makes adolescence a critical and susceptible phase for experimenting with and initiating tobacco-use.

According to the Global Tobacco Youth Survey (GTYS), 15% of Indian school students between the ages of 13 and 15 years reported tobacco use; and another 15% of non-users reported intent to start smoking (Gajalakshmi and Kanimozhi, 2010); and use is increasing among urban youth (Mathur, 2008). India is a demographically young country with almost 20% of its population between the ages of 10-19 years, which translates to roughly 236 million people (Office of the Registrar General and Census Commissioner of India, 2011). The current and intended tobacco use among Indian adolescents will only exacerbate the burden of tobacco related morbidity and mortality in the country.

Supari, also known as areca nut or betel nut, has been classified as carcinogenic, and is one of the most widely consumed addictive substances in India after nicotine, ethanol and caffeine. Supari or areca nut is a risk factor for cancers of the mouth and esophagus, type II diabetes, asthma, myocardial infarction and obesity, and also affects fetal growth during pregnancy (Garg et al., 2014). Areca nut is used in India as an ingredient of many smokeless tobacco products and various sweetened areca nut preparations are marketed by companies in attractive colorful sachets and promoted for children as flavored Supari (Arora, 2012). Chewing Supari starts at a young age, and it is being consumed freely by children (Oakley et al., 2005; Boucher and Mannan, 2002).

Globally tobacco consumption is strongly associated with low socioeconomic status (Jarvis and Wardle, 2006). Several large, cross-sectional studies of adults in India have also demonstrated that tobacco use is highest among marginalized groups in this country (Neufeld et al., 2005; Sorensen et al., 2005; Rani et al., 2003). A cross-sectional study with students in Delhi and Chennai

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showed those attending government schools, which usually serve students from lower socioeconomic status backgrounds, had a higher prevalence of tobacco use compared with students attending private schools who are more likely from higher socioeconomic groups (18.9% vs. 12.2%, respectively) (Mathur, 2008). Similarly, a study using a national sample of 15 to 24 year-olds found that majority of tobacco users were from low socioeconomic groups (Mathur et al., 2015). These social inequalities in tobacco-use underscore the need for strategies and interventions for tobacco control and prevention among adolescents and youth from lower socioeconomic backgrounds.

The purpose of this study was to describe and examine factors associated with use of tobacco among students from low-income families attending local government managed or aided-schools in the city of Mumbai, India.

Materials and Methods

Study population and study site

A cross-sectional survey was conducted with students from schools managed or aided by the local government of the city of Mumbai, the capital city of the state of Maharashtra as well as the commercial capital of India. With a population of more than 18 million, Mumbai is one of the most densely populated urban areas in the world and adolescents constitute 20% of the city's population (Office of the Registrar General and Census Commissioner of India, 2011). According to 2011 data, almost 4,00,000 students were enrolled in primary schools and 60,000 students in secondary schools managed or aided by the city's local government (Damani, 2011).

The sample for this study consisted of 1918 adolescent male and female students from 7th, 8th and 9th grades studying in twelve government managed or aided schools across Mumbai. These schools cater to students from low-income communities; have a uniform management structure, type of teachers, curriculum and academic performance indicators.

Data collection

A structured questionnaire was used to collect data from students in the classroom setting. The questionnaire captured (i) socio-demographic details of participants including gender, age, grade and division; (ii) ever-use of tobacco and supari (which is chewable areca nut and a known carcinogen); and (iii) tobacco-related knowledge, attitudes and beliefs through items such as 'Tobacco users have more friends', 'Is it possible to purchase tobacco within 100 yards of the school', 'Smoking is a cool behavior', 'Smoking relieves stress', How, easy is it to turn down a request to smoke made by a friend?' Is, there an association between tobacco use and health problems?' The first draft of the questionnaire was read by two experts to check if the items measured what they intended to measure. A third expert checked the questionnaire for any negative, double-barreled or leading questions. After ensuring the face validity of the questionnaire, it was pretested with twenty students who were representative of the study sample. The findings from the pretest helped in making revisions to the questionnaire. The final draft was checked for accuracy and translated into the local languages of Hindi and Marathi.

Participating students from each school were gathered in their respective classrooms during school-hours. Trained facilitators introduced and explained the questionnaire in the local language of Hindi or Marathi as per the needs of the students in each school. After the facilitator read out each question, respondents marked their response on the questionnaire. Given the comprehension level of the students the researchers decided to use this method over a completely self-administered survey. Facilitators were trained in rapport establishment with children, standardized techniques of introducing and explaining questions to the students, maintaining confidentiality of respondents and scrutinizing filled instruments for completeness. Data collection for this study was conducted over two weeks in the month of July 2015.

The study was approved by the Institutional Ethical Review Board of Narotam Sekhsaria Foundation and Salaam Bombay Foundation. Written consent for the study was sought from school principals. Parents of students were also informed about the scope of the study and gave a written consent before the recruitment of their children in the study. Additionally, student assent was sought before responding to the questionnaire.

Data analysis

At the first level of statistical analysis, descriptive statistics for all collected data were generated. The association of studied variables with use of tobacco was measured using the chi-square test or t-test, as appropriate. We also conducted a logistic regression model to identify the association of the studied variables with use and non-use of tobacco. A p-value of < 0.05 was considered significant. Data were analyzed using Stata software version 14.0 (Statacorp, 2015)

Results

A total of 1918 students from 12 schools participated in this study. The mean age of the students was 13.4 ± 1.3 years (range 10 – 18); 49% (n = 949) were males; and 48% (n = 921) were from the 9th grade, followed by 34% (638) from the 8th and 18% (342) from 7th grade.

Five percent of all student participants (n=100) had ever-used tobacco; and 32% (621) reported ever-using supari. Only 26 students (1%) perceived smoking as a cool behavior and a lesser number (n=19) associated use of smokeless tobacco with coolness; 48 (4%) students said that smoking relieves stress and less than 2% said smokeless tobacco relieves stress.

However, 35% stated there was no association between tobacco use and health problems; and about 12% of students said that those who use tobacco have more friends. Almost one in five students (21%; n=405) said that it is not easy to refuse a best friend's request to smoke; and more than half (53%; n=999) said it was possible to purchase tobacco within 100 yards of the school premises (see Table 1).

As shown in Table 2, the bivariate analysis revealed

Table 1. General Characteristics of the Sample

Description of variables	Total sample (N=1,918)
Age (Mean)	13.4
10 – 12 years	499 (26%)
13 – 15 years	1,293(67%)
16 – 18 years	113 (7%)
Gender	
Male	949 (49%)
Female	969 (51%)
Grade	
7th	350 (18%)
8th	641 (34%)
9th	927 (48%)
Ever use of Supari	623 (32%)
Tobacco-related knowledge, attitudes and beliefs (affirmative responses to statements)	
Smoking is a cool behavior	26 (1%)
Use of smokeless tobacco is a cool behavior	17 (1%)
Smoking relieves stress	48 (3.6%)
Smokeless tobacco relieves stress	31 (2%)
There is an association between tobacco use and health problems	1,249 (65%)
People who use tobacco have more friends	215 (12%)
It is not all easy to turn down a request to smoke, made by a best friend	405 (21%)
It is possible to purchase tobacco within 100 yards of school premises	998 (52%)

Table 2: Comparison of Characteristics of Tobacco Users and Non-Users

Description of variables	Tobacco users (N=100)	Non-users (N=1,812)	p-value
Age (Mean)	14.37	13.37	0.000
10 – 12 years	6 (6%)	493 (27%)	
13 – 15 years	73 (73%)	1220 (67%)	
16 – 18 years	21 (21%)	92 (6%)	
Gender			
Male	87 (87%)	859 (47%)	0.000
Female	13 (13%)	953 (53%)	
Grade			
7th	9 (9%)	333 (18%)	0.003
8th	27 (27%)	611 (34)	
9th	64 (64%)	857 (48%)	
Ever use of Supari	88 (88%)	533 (29%)	0.000
Tobacco-related knowledge, attitudes and beliefs (affirmative responses to statements)			
Smoking is a cool behavior	7 (7%)	19 (1%)	0.000
Use of smokeless tobacco is a cool behavior	3 (3%)	14 (0.7%)	0.05
Smoking relieves stress	14 (14%)	34 (1.8%)	0.000
Smokeless tobacco relieves stress	5 (5%)	26 (1.7%)	0.018
There is an association between tobacco use and health problems	76 (76%)	1173 (65%)	0.017
People who use tobacco have more friends	33 (33%)	182 (10%)	0.000
It is not all easy to turn down a request to smoke, made by a best friend	34 (34%)	371 (20%)	0.002
It is possible to purchase tobacco within 100 yards of school premises	84 (84%)	914 (50%)	0.000

a significant difference between the mean age of tobacco users and non-users ($P < 0.001$). Male students (87%) were significantly more likely to report ever-use of tobacco as compared to females (13%) ($P < 0.001$). Supari use was also significantly higher among tobacco users (88%) as compared to non-users (29%) ($P < 0.001$).

Although a very small number of students believed that tobacco use was cool or relieved stress, the numbers were higher in those who had ever-used compared to non-users. A slightly higher proportion of non-users (35%) were more likely to be unaware of health consequences as compared to 24% of ever-users. The proportion of students reporting that people who consumed tobacco had more friends was higher among tobacco users (33%) than non-users (10%); and more tobacco-users (34%) as compared to non-users (20%) reported difficulty in refusing a best friend's request to smoke. A significantly higher proportion of tobacco users (84%) reported that it was possible to purchase tobacco within 100 yards of the school premise ($P < 0.001$).

A logistic regression model helped determine factors significantly associated with ever-use of tobacco as compared to non-use. As shown in Table 3, male students were almost twice as likely (OR=2.5, $P <= 0.05$) and supari users were eight times more likely (OR=8.99, $P < 0.001$) to have ever-used tobacco. Tobacco-use was also significantly associated with agreement to the statements: 'People who use any form of tobacco have more friends' (OR=2.8, $P = 0.004$); 'It is possible to purchase any tobacco product within 100 yards of school' (OR=10.8, $P < 0.001$); and 'Smoking relieves stress' (OR=5.6, $P = 0.002$). Some variables that were significantly associated with tobacco use in the bivariate analysis such as - 'age,' belief that 'smoking is a cool behavior' or 'easy to turn down a smoking request' and 'tobacco use is associated with health problems'—were not significant in the logistic regression model.

Discussion

This study found that about 5% of students reported ever-using tobacco, which is lower than 15% tobacco

Table 3. Ever-Use of Tobacco by Specific Respondent Characteristics: Factors Associated with Higher Risk of Ever Use of Tobacco

Variables	Adjusted Odds Ratio	(95% Confidence Interval)	p-value
Gender (Female 0)	2.5	(1.0, 6.1)	0.05
Age (12 years or less 0)	1.0	(1.0, 1.1)	0.657
Ever use of Supari (non-user 0)	9.0	(3.3, 24.7)	0
People who use any form of tobacco have more friends (Disagree 0, Agree 1)	2.8	(1.4, 5.6)	0.004
It is possible to purchase any tobacco product within 100 yards of the school (No 0)	10.8	(3.0, 38.6)	0
Smoking is cool (Disagree 0)	1.6	(0.4, 7.1)	0.534
Smoking relieves stress (Disagree 0)	5.6	(1.9, 16.3)	0.002
Turn down smoking request made by a friend (Easy 0, Not easy 1))	2.1	(0.9, 1.6)	0.077
Tobacco use is associated with health problems (No 0)	1.0	(0.5, 2.1)	0.978

use among students found by the Global Tobacco Youth Survey (GTYS) (Gajalakshmi and Kanimozhi, 2010). Being male and a Supari user were factors significantly associated with tobacco use.

Male students were more almost twice as likely to report tobacco use in this study. Similar results have been reported in school-based surveys with adolescents across Indian cities (Gajalakshmi and Kanimozhi, 2010; Gupta et al., 2014; Kumar et al., 2014; Muttappallymyalil et al., 2012; Ningombam et al., 2011).

One in three (32%) students in this study used Supari; and Supari users were also eight times more likely than non-users to have ever used tobacco. However, the estimate of 32% in this study is slightly higher than the prevalence of Supari use of 23% and 27% reported by recent cross-sectional studies conducted in government schools in Mumbai (Arora, 2012; Rose, 2014). Surveys conducted in schools in Indian cities have found that majority of students are unaware of the harmful effects of chewing supari (Rose, 2014; Nitin et al., 2010; Rajan et al., 2007). Although the link between supari and tobacco use and whether supari serves as a gateway for tobacco use has to be examined in greater detail in future studies; from a prevention standpoint it may be important for school-based tobacco control programs to comprehensively address both tobacco and supari use.

Age was not associated with the use of tobacco in this study. Research with school students in Indian cities show mixed results on the association between age and tobacco use. In some studies, younger children were found to be more likely to use tobacco (Reddy et al., 2006; Sinha et al., 2004) and in others increased tobacco use was associated with older children (Sen and Basu, 2000). This finding thus needs to be further examined in the context of low-income schools in Mumbai.

This study highlights some of the possible gains made by earlier tobacco prevention campaigns, especially with respect to change in attitudes to tobacco among students. A negligible proportion (1%) thought that tobacco use was cool or that it relieved stress. There could be multiple reasons underlying this including a global trend of smoking as a negative behavior as well as visible measures taken by the government. The Government of India has banned smoking in public places and also enacted a legislation under its Cigarettes and Other Tobacco Products Act, whereby every television and film displaying occurrences of tobacco use has to include a 30 second anti-tobacco disclaimer emphasizing the ill effects of tobacco use at the start and middle of the broadcast, and also a display of warning signs such as 'Smoking Kills' at the bottom of the screen when use of tobacco products are displayed. This is conducted during routine screenings of movies, music videos on Indian television (Government of India, 2012). Furthermore, community based agencies such as Salaam Bombay Foundation have been conducting tobacco prevention and education programs in local government schools that serve low-income communities in Mumbai (Sorenson et al., 2012; SBF, 2016).

However, what is worrisome in these findings is that despite large scale communication about the health risks of tobacco consumption, almost a third of the students were not aware of the association between tobacco use and health problems with more non-users being unaware. This shows the unending and relentless task ahead for tobacco prevention programs. Adolescents have to be continuously made aware of health risks associated with tobacco-use behavior.

Students who perceived that people who use tobacco have more friends were twice as likely to report tobacco-use and one in five said it would not at all be easy to turn down a tobacco use request made by a friend. This perception that people who smoke have more friends continues to persist among a large proportion of smokers. Several studies have shown that peer groups play a significant role in influencing tobacco use as well as cessation among adolescents and youth (Heikkinen et al., 2009; Leatherdale and Manske, 2005; Patel 1999). In adolescent and youth users, smoking could perform functions of managing stress and socializing during exams or managing social relationships (Nichter et al., 2007). In order to craft effective cessation programs, it becomes important to understand the context in which adolescents engage in smoking behavior, particularly the dynamics of peer groups. This has to be examined in future research in this area. Systematic reviews of peer-led and peer-based tobacco prevention and control interventions have reported the effectiveness of a peer approach (MacArthur et al., 2015; Klatt et al., 2008).

More than half of the students said it was possible to purchase tobacco within 100 yards of the school

premises, despite the government enforced prohibition of sale and use of tobacco within this zone as per the Indian tobacco control legislation – Cigarettes and Other Tobacco Products Act, commonly known as COTPA. A recent study in the state of Maharashtra found that 57% of surveyed schools did not comply with this provision and had vendors selling tobacco within 100 yards of the premises (Rimal, 2013). Similarly, a cross-sectional study conducted in 26 schools in Mumbai (Mistry et al., 2015) found 1741 tobacco vendors within 500 yards of schools and 221 vendors located within the prohibited 100-yard zone, and reported an association between tobacco vendor density within 200 to 500 yards of school premises and tobacco use among adolescent students. Lack of compliance with this provision makes tobacco, especially the smokeless varieties, easily available and accessible to young students' right outside their schools, which highlights the need for stronger compliance and enforcement measures. However, in a congested city such as Mumbai, it may also be extremely difficult to follow the 100-yard rule due to a lack of space. Policy makers, community-based agencies and researchers have to work together with stakeholders, including representatives of tobacco industry and local market associations to find the best possible means of implementing this component of COTPA in over-crowded urban areas.

This study has its set of limitations. The data were collected from adolescents who attended conveniently selected local-government managed schools in Mumbai and might not be representative of all adolescents in the city or country. Use of tobacco and supari was based on self-report by the student participants which could be a source of bias with either under-reporting or over-reporting of the behavior. Surveys conducted in classroom settings especially on sensitive topics such as tobacco use, could also lead to social desirability bias.

While the findings, especially with respect to negative attitudes toward smoking, perhaps, demonstrate some of the achievements of previous tobacco prevention efforts, this study also highlights the need for comprehensive school-based tobacco control initiatives that address prevention and cessation of both tobacco and supari use.

School-based programs would be ideal in order to reach out to a large number of adolescents and influence behavior change at a young age and involve adolescents in advocacy efforts for ensuring tobacco-free spaces in schools and communities. It seems possible for India to ensure that tobacco prevention and control programs reach every school because the country has been credited for reducing its out of school children by over 90%, achieving the goal of Universal Primary Education, and has been found to be the only country in South and West Asia with an equal ratio of girls to boys in both primary and secondary education (UNESCO, 2015).

However, in order to develop appropriate and effective school programs, policy makers and tobacco control practitioners need to understand the characteristics of adolescent tobacco-users and what differentiates them from non-users. While this study has reported a wide gender gap in tobacco use unlike what is found in developed countries, both boys and girls should be reached through tobacco control programs with the recognition that recent data from India shows that the numbers of women smokers has gone up in the country (IHME, 2014) and that each gender group's decision to start using tobacco are influenced by different cultural, psycho-social and socioeconomic factors (WHO, 2010).

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