Why are urban Indian 6th graders using more tobacco than 8th graders? Findings from Project MYTRI

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RESEARCH PAPER

Why are urban Indian 6th graders using more tobacco than 8th graders? Findings from Project MYTRI

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Objective: To investigate why urban Indian 6th graders may be using more tobacco than urban Indian 8th graders.

Design: Cross-sectional survey of students conducted in the summer of 2004, as the baseline evaluation tool for a group-randomised tobacco prevention intervention trial (Project MYTRI). Mixed-effects regression models were used to (1) examine the relationship between 15 psychosocial risk factors and current use of any tobacco, by grade; and (2) examine differences in psychosocial risk factors, by grade.

Setting: Thirty-two private (high socioeconomic status (SES)) and government (low-mid SES) schools in two large cities in India (Delhi and Chennai).

Subjects: Students in the 6th and 8th grade in these schools (n = 11642). Among these, 50.6% resided in Delhi (v Chennai), 61.4% attended a government school (v a private school), 52.9% were enrolled in 6th grade (v 8th), and 54.9% were male (v female).

Main outcome measure: Current (past 30 day) use of any tobacco, including chewing tobacco (for example, gutkha), bidis, or cigarettes.

Result: Almost all psychosocial factors were significantly related to tobacco use, for students in both grades. Some of the strongest correlates included social susceptibility to and social norms about use. Exposure to tobacco advertising was a strong correlate of tobacco use for 6th graders, but not for 8th graders. Sixth graders scored lower than 8th graders on almost all factors, indicating higher risk.

Conclusions: The ''risk profile'' of 6th graders suggests they would be vulnerable to use and to begin using tobacco, as well as to outside influences that may encourage use.

The World Health Organization predicts that during the first two decades of the 21st century, India will experience the fastest rate of rise in deaths attributable to tobacco worldwide.[1] Given a population of over one billion people, this exponential increase in tobacco-related mortality—from 1.4% of all deaths in India in 1990 to 13.3% in 2020—will result in tremendous social and economic burdens for this country.[1] The health effects associated with tobacco use in India are more diverse than in other countries of the world, because tobacco is consumed in multiple forms.[1] In general, cigarettes account for only 20% of all tobacco consumed, while bidis (hand-rolled cigarettes) and gutkha (chewing tobacco) each account for about 40% of tobacco consumption.[2]

Tobacco use among youth in India seems to be becoming more of a problem, especially in urban areas. Anecdotal evidence suggests age of initiation is declining, with reports of children beginning to use tobacco as young as 10.[3] There is also empirical evidence to suggest the use of tobacco is increasing among young people, in places like Delhi and Mumbai. In 2001, as part of the Global Youth Tobacco Survey (GYTS), 4.5% and 4.0% of students in grades 8–10 in these cities reported regular use of any tobacco.[4] In 2004, in a survey funded by the Indian Cancer Society, 8% of students in grades 7–10 in these cities reported the same, i2dicating that tobacco use had almost doubled among youth in Delhi and Mumbai in less than three years.[5] In all surveys, smokeless forms of tobacco use (for example, gutkha) were more popular than smoked forms (for example, cigarettes, bidis). Tobacco use among youth in cities in India, therefore, warrants further aetiologic investigation and, ultimately, robust intervention.

This paper describes recent findings related to tobacco use among urban Indian youth from Project MYTRI (Mobilising Youth for Tobacco Related Initiatives in India), a group-randomised, intervention trial funded by the Fogarty Initiative described in this supplement, that is designed to prevent and/or reduce tobacco use among students in grades 6–9 (n = ~12 000) in 32 schools in two large cities (Delhi, Chennai) in India. The project is a partnership between the University of Minnesota in the USA and two non-governmental organisations (NGOs) in India: HRIDAY (Health Related Information Dissemination Amongst Youth, in Delhi) and TNVHA (Tamil Nadu Voluntary Health Association, in Chennai). The goals of this project are: (1) to design, implement, and evaluate the efficacy of a tobacco prevention intervention for youth in urban India; (2) to educate and activate students, parents, and school staff to take strong action against tobacco use in India; and (3) to develop capacity among study staff for doing sound prevention science in this setting.

The project addresses multiple forms of tobacco use (for example, gutkha, bidis, cigarettes) and involves two cohorts of students (who were 6th and 8th graders in 2004) from socioeconomically diverse backgrounds. In the first survey of these two cohorts, we were surprised to observe that students in the 6th grade actually reported *more* tobacco use than students in the 8th grade—and by a wide margin at that. Tobacco use among 6th graders was, overall, 2–4 times *higher* than that of the 8th graders.[6] After adjusting for differences in tobacco use by other demographic factors (that is, age, sex, type of school, and city), the prevalence of lifetime tobacco use for 6th graders was 21.8%, compared to just 6% among

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Abbreviations: GYTS, Global Youth Tobacco Survey; HRIDAY, Health Related Information Dissemination Amongst Youth; MYTRI, Mobilising Youth for Tobacco Related Initiatives in India; TNVHA, Tamil Nadu Voluntary Health Association

8th graders (p < 0.01), and current use of any type of tobacco was three times higher among 6th graders (6.7% v 2.2%, p < 0.01). This finding is highly unusual, since grade level is typically positively, not inversely, related to tobacco use in the West (that is, tobacco use usually increases, not decreases with grade level).[7]

The purpose of this paper is to explore possible explanations for why students in the 6th grade might be using tobacco at higher rates. Specifically, the paper addresses two research questions: (1) does the association between potential risk factors and tobacco use differ by grade level; and, (2) are there differences in the magnitude or distribution of risk factors by grade? To date, a limited number of studies examining the aetiology of tobacco use in urban Indian youth have appeared in the literature, and none address this important difference observed in this particular project between cohorts, or grades.

METHODS
Study design
Project MYTRI is a nested cohort, group-randomised trial.[8] In 2004, 32 schools in Delhi (n = 16) and Chennai (n = 16) were recruited to participate in the trial, matched according to type of school (private v government; co-ed v boys-only v girls-only), and randomly assigned to receive a tobacco prevention programme or serve as a delayed programme control.[6][9] The intervention consists of teacher- and peer-led classroom curricula; parent education through parent postcards; school posters that coordinate with the curricula; and peer-led health activism. The intervention is being implemented with two cohorts of students over two consecutive school years (2004–05 and 2005–06), and subsequently evaluated using three repeated surveys of the cohorts (in 2004, 2005, and 2006). Ethical clearances for the trial were obtained from the IEC in India (Independent Ethics Committee, Mumbai) and IRB in Minnesota (Institutional Review Board, Minneapolis). Passive parental consent and active student assent are required and obtained by staff before survey administration. This study is an analysis of data collected before the intervention had begun. The study is cross-sectional by design.[10]

Participants
All students enrolled in the 6th and 8th grade in the 32 schools were eligible for this study and invited to participate (n = 12484). These students will be surveyed again in 2005 and 2006, when they are in 7th/9th and 8th/10th grades, respectively. The response rate for the baseline survey was 94.1% (n = 11748). Non-participants included parent refusals (< 1%), student refusals (< 1%), and student absentees (> 4%). Response rates did not vary by city, school, or grade. Students who responded inconsistently to four or more questions on the survey (for example, reporting tobacco use in the past month but not tobacco use in their lifetime) were eliminated from analysis (< 1% of sample). The final sample of analysis for this study was 11 642 students. Of these, 50.6% resided in Delhi (v Chennai), 61.4% attended a government school (v a private school), 52.9% were enrolled in 6th grade (v 8th), and 54.9% were male (v female). The mean age of the 6th and 8th graders was 11.2 and 12.9 years, respectively (range 10–16 years).

Measures
A self-administered pencil and paper survey was implemented in all classrooms in these schools by two-person teams of trained staff using standardised protocols. The confidentiality of student responses was assured. A unique ID not recognisable to the students or school staff will be used to track students over time in subsequent survey administrations. Surveys were administered in English, Hindi, and Tamil, based on the medium of instruction in schools. All private schools in Delhi and Chennai received an English survey, while the government schools received a Hindi version in Delhi and a Tamil version in Chennai. The survey is adapted from other instruments used in prior research, including the GYTS and a survey specific to Indian youth.[4][11] The survey underwent a rigorous pilot process before implementation, to ensure reasonable reliability and validity among both the 6th and 8th grade students.[6]

Tobacco use
Three items were used to measure current use of tobacco: "During the last 30 days, did you chew tobacco in any form?", "During the last 30 days, did you smoke one or more bidis?", and "During the last 30 days, did you smoke one or more cigarettes?" The response categories for all of the items were "Yes" or "No". Using the responses to the three items, a composite variable was created to measure current use of *any* tobacco. Students who responded "Yes" to one or more of the questions were given a "1" on this variable (for "use"), while all other students received a "0" ("no use").

Psychosocial risk factors
Multiple item, summative scales were created to measure 15 psychosocial risk factors hypothesised to be related to tobacco use among youth in India and (in most cases) were targets of the tobacco prevention programme.[12] These included measures of intra-personal factors (for example, knowledge about health effects of tobacco use) and social-environmental factors (for example, social normative beliefs). Table 1 provides a description of each scale, including the Cronbach's α and an example of an item used to construct the scale. Scale scores were standardised before being used in the analyses (that is, the mean of each scale was set to zero and its standard deviation to 1), to ease interpretation of parameter estimates and allow for comparisons between scales. A higher score on all scales indicates less risk, or conversely is more protective. Thus, the scales were hypothesised to be inversely (or negatively) related to increased tobacco use. Moreover, 6th graders were hypothesised to score lower than 8th graders on scales, given our findings of greater tobacco use among 6th graders. These factors are organised in the tables to be consistent with our intervention model (fig 1).[12]

Data analysis
Mixed-effects regression models were used to examine the relationship between all psychosocial risk factors and current use of any tobacco. These kinds of regression models are appropriate for studies like these, given their nested design, as they account for the variability in tobacco use between students, and between schools.[8][13] The regression models were stratified by grade, and then adjusted for city, type of school, sex, and age. One set of models ("model 1") was used to examine the relationship between a single psychosocial factor and tobacco use separately (that is, unadjusted for other psychosocial factors). Backwards, stepwise regression was then used to build a final model ("model 2") to evaluate which factors were most strongly related to tobacco use. All psychosocial factors were entered into the regression model to begin, and then factors not significantly related to tobacco use in the model (p > 0.01) were eliminated one at a time. Mixed-effects models were also used to examine differences in psychosocial risk factors, by grade. These models were adjusted for city, type of school, sex, and age. An absolute difference in "risk" was calculated for each factor between grades (that is, mean, grade 6 – mean, grade 8) to allow for comparisons between factors as well.

Table 1 Description of multi-item scales used to measure psychosocial risk factors (n = 11642)

	Items	α	Range	Mean	(SD)	Example of item on scale
Intra-personal factors*						
Knowledge of health effects	5	0.66	0–10	7.59	(2.42)	"Are all kinds of tobacco use dangerous?"
Beliefs about social effects	5	0.88	0–15	11.14	(4.73)	"If you used tobacco, would your parents get angry?"
Reasons to use tobacco	6	0.73	0–18	15.49	(3.19)	"Does using tobacco make a person appear to be more grown up?"
Reasons not to use tobacco	5	0.84	0–15	7.81	(5.40)	"I do not want to use tobacco because my friends do not use it."
Self-efficacy (refusal skills)	5	0.98	0–15	5.30	(6.54)	"Could you say no if a close friend gave you tobacco?"
Social susceptibility (chewing)	4	0.87	0–12	11.13	(1.98)	"If someone at a party gave you tobacco, would you chew it?"
Social susceptibility (smoking)	4	0.88	0–12	11.42	(1.64)	"If someone at a party gave you tobacco, would you smoke it?"
Social-environmental factors*						
Normative beliefs about use	6	0.79	0–18	16.45	(2.68)	"Is it okay for people your age to try tobacco out of curiosity?"
Perceived prevalence (chewing)	4	0.64	0–12	6.96	(2.31)	"How many boys your age in India do you think chew tobacco?"
Perceived prevalence (smoking)	4	0.66	0–12	7.14	(2.34)	"How many boys your age in India do you think smoke tobacco?"
Normative expectations of use	6	0.91	0–18	15.62	(4.26)	"If you were to use tobacco, would your close friends like it?"
Knowledge about public policies	3	0.60	0–6	3.29	(1.82)	"Does your state have a law [that bans tobacco sales to minors]?
Support for public policies	5	0.79	0–15	13.65	(2.58)	"Should smoking be permitted in public places?"
Self-efficacy (advocacy skills)	8	0.93	0–24	16.86	(7.48)	"Do you think you could help a friend stop using tobacco?"
Exposure to advertising	7	0.79	0–7	3.40	(2.18)	"Have you seen any advertisements for tobacco in movies?"

*A higher score on all multi-item scales for all factors indicates *less risk*, or conversely, is more protective.

RESULTS

Almost all of the psychosocial factors evaluated here were significantly related to current use of tobacco, for students in both grades. Table 2 presents the results of the analyses for 6th grade students, while table 3 presents the results for the 8th graders.

Among 6th grade students (table 2), all of the psychosocial factors were inversely associated with increased use of tobacco except for reasons students may have *not* to use tobacco (for example, "I do not want to use tobacco because my friends do not use it") and awareness about public policies related to tobacco control (for example, "Does your state have a law that bans the sale of tobacco to minors?") (p > 0.05). The same two factors were also *not* associated with increased tobacco use in 8th grade (p > 0.05). In addition, refusal skills self-efficacy (for example, "Could you say 'no' if a close friend gave you tobacco?") was *not* significantly related to tobacco use in the older cohort, nor was, notably, exposure to tobacco advertising (for example, "Have you seen any advertisements for tobacco in movies?" ".. in magazines?") (p > 0.05) (table 3).

Among 8th grade students (table 3), five factors were most strongly related to increased use of tobacco. In order of decreasing strength, these factors included social suscept-
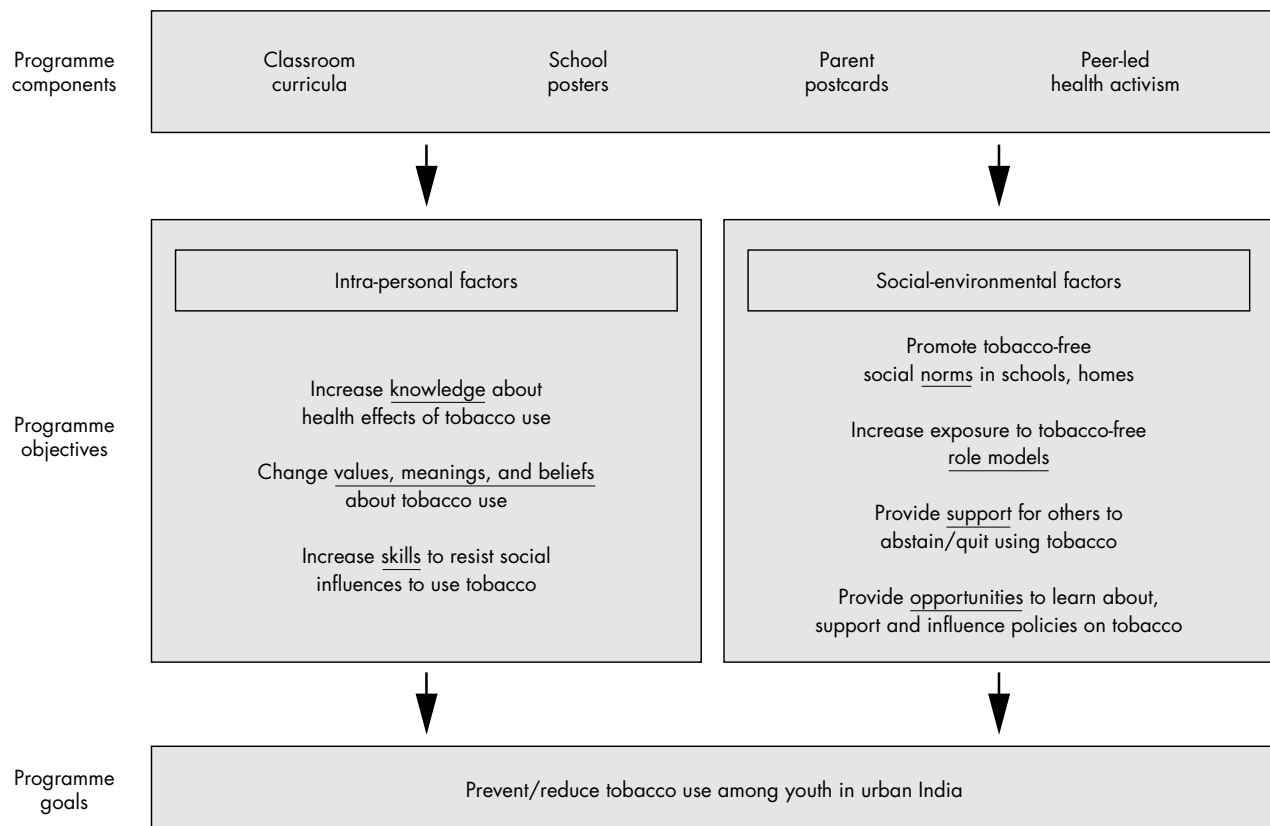
Programme components	Classroom curricula	School posters	Parent postcards	Peer-led health activism

Intra-personal factors

Increase <u>knowledge</u> about health effects of tobacco use

Change <u>values, meanings, and beliefs</u> about tobacco use

Increase <u>skills</u> to resist social influences to use tobacco

Social-environmental factors

Promote tobacco-free social <u>norms</u> in schools, homes

Increase exposure to tobacco-free <u>role models</u>

Provide <u>support</u> for others to abstain/quit using tobacco

Provide <u>opportunities</u> to learn about, support and influence policies on tobacco

Programme objectives

Programme goals

Prevent/reduce tobacco use among youth in urban India

Figure 1 Intervention model for Project MYTRI (Mobilising Youth for Tobacco Related Initiatives in India).

Table 2 Relationship between psychosocial risk factors and current use of tobacco, 6th graders (n = 6165)*

	Model 1§			Model 2¶		
	Mean	(SE)	p Value	Mean	(SE)	p Value
Intra-personal factors†‡						
Knowledge of health effects	−0.014	(0.003)	<0.01	–	–	–
Beliefs about social effects	−0.013	(0.003)	<0.01	–	–	–
Reasons to use tobacco	−0.050	(0.003)	<0.01	–	–	–
Reasons not to use tobacco	0.003	(0.004)	0.43	–	–	–
Self-efficacy (refusal skills)	0.014	(0.004)	<0.01	–	–	–
Social susceptibility (chewing)	−0.056	(0.003)	<0.01	−0.026	(0.003)	<0.01
Social susceptibility (smoking)	−0.061	(0.003)	<0.01	−0.031	(0.004)	<0.01
Social-environmental factors†‡						
Normative beliefs about use	−0.052	(0.003)	<0.01	–	–	–
Perceived prevalence (chewing)	−0.025	(0.003)	<0.01	−0.012	(0.003)	<0.01
Perceived prevalence (smoking)	−0.022	(0.003)	<0.01	−0.012	(0.003)	<0.01
Normative expectations of use	−0.037	(0.003)	<0.01	–	–	–
Knowledge about public policies	0.002	(0.003)	0.49	–	–	–
Support for public policies	−0.050	(0.003)	<0.01	−0.020	(0.003)	< 0.01
Self-efficacy (advocacy skills)	−0.011	(0.003)	<0.01	−0.009	(0.003)	< 0.01
Exposure to advertising	−0.015	(0.003)	<0.01	−0.011	(0.003)	< 0.01

*Estimates are generated from mixed-effects models that are adjusted for city, type of school, sex, and age.
†A higher score on all multi-item scales for all factors indicates *less risk*, or conversely, is more protective.
‡Scale scores of factors were standardised before being analysed, so estimates can be compared across factors.
§Examines the relationship between the psychosocial factor and tobacco use, without adjusting for other factors.
¶Examines the relationship between the psychosocial factor and tobacco use, after adjusting for the other factors.

ibility to chewing tobacco (for example, ''If someone at a party gave you tobacco, would you chew it?''), social susceptibility to smoking bidis or cigarettes (for example, ''If someone at a party gave you tobacco, would you smoke it?''), support for policies for tobacco control (for example, ''Should smoking be permitted in public places?''), normative expectations of tobacco use (for example, ''If you were to use tobacco, would your close friends like it?''), and, finally, perceived prevalence of chewing tobacco (''How many boys your age in India do you think chew tobacco?'') (p < 0.01). In all, these five factors accounted for 14.9% of the variability between students and 48.5% of variability between schools in current use of tobacco for 8th grade.

A similar set of factors were most strongly associated with increased tobacco use in 6th grade, too (table 2). The factors included, in order of decreasing strength, social susceptibility to smoking, social susceptibility to chewing tobacco, support

for tobacco control policy, perceived prevalence of chewing, perceived prevalence of smoking (for example, ''How many boys your age in India do you think smoke tobacco?''), and advocacy skills efficacy (for example, ''Do you think you could help a friend stop smoking?'') (p < 0.01). Notably, exposure to tobacco advertising was strongly associated with increased tobacco use among the 6th graders as well (p < 0.01)—though, as noted above, it was not at all for 8th graders (p > 0.05). In all, these seven factors accounted for 31.2% of variability between students and 65.4% of variability between schools in current use of tobacco, among students in the 6th grade.

There were significant differences between 6th and 8th grade in the distribution of all 15 psychosocial risk factors (p < 0.01) (table 4). Students in the 6th grade scored lower on all of the factors (thereby indicating they were at increased risk as compared to the 8th graders), except for

Table 3 Relationship between psychosocial risk factors and current use of any kind of tobacco, 8th graders (n = 5477)*

	Model 1§			Model 2¶		
	Mean	(SE)	p Value	Mean	(SE)	p Value
Intra-personal factors†‡						
Knowledge of health effects	−0.013	(0.003)	<0.01	–	–	–
Beliefs about social effects	−0.019	(0.003)	<0.01	–	–	–
Reasons to use tobacco	−0.024	(0.002)	<0.01	–	–	–
Reasons not to use tobacco	−0.004	(0.003)	0.22	–	–	–
Self-efficacy (refusal skills)	0.000	(0.003)	0.92	–	–	–
Social susceptibility (chewing)	−0.062	(0.003)	<0.01	−0.035	(0.003)	<0.01
Social susceptibility (smoking)	−0.059	(0.003)	<0.01	−0.033	(0.003)	<0.01
Social-environmental factors†‡						
Normative beliefs about use	−0.038	(0.003)	<0.01	–	–	–
Perceived prevalence (chewing)	−0.014	(0.003)	<0.01	−0.011	(0.003)	< 0.01
Perceived prevalence (smoking)	−0.009	(0.003)	<0.01	–	–	–
Normative expectations of use	−0.030	(0.003)	<0.01	−0.012	(0.003)	< 0.01
Knowledge about public policies	−0.002	(0.002)	0.39	–	–	–
Support for public policies	−0.036	(0.003)	<0.01	−0.012	(0.003)	< 0.01
Self-efficacy (advocacy skills)	−0.012	(0.003)	<0.01	–	–	–
Exposure to advertising	−0.005	(0.003)	0.07	–	–	–

*Estimates are generated from mixed-effects models that are adjusted for city, type of school, sex, and age.
†A higher score on all multi-item scales for all factors indicates *less risk*, or conversely, is more protective.
‡Scale scores of factors were standardised before being analysed, so estimates can be compared across factors.
§Examines the relationship between the psychosocial factor and tobacco use, without adjusting for other factors.
¶Examines the relationship between the psychosocial factor and tobacco use, after adjusting for the other factors.

Table 4 Distribution of psychosocial risk factors between 6th and 8th graders (n = 11642)*

	6th grade (n = 6165)		8th grade (n = 5477)			
	Mean	(SE)	Mean	(SE)	Diff§¶	p Value
Intra-personal factors†‡						
Knowledge of health effects	−0.27	(0.03)	0.25	(0.03)	0.52	<0.01
Beliefs about social effects	−0.24	(0.04)	0.29	(0.04)	0.53	<0.01
Reasons to use tobacco	−0.07	(0.02)	0.02	(0.02)	0.09	<0.01
Reasons not to use tobacco	−0.07	(0.03)	0.23	(0.03)	0.30	<0.01
Self-efficacy (refusal skills)	−0.08	(0.04)	0.20	(0.04)	0.28	<0.01
Social susceptibility (chewing)	−0.22	(0.03)	0.11	(0.03)	0.33	<0.01
Social susceptibility (smoking)	−0.18	(0.03)	0.14	(0.03)	0.32	<0.01
Social-environmental factors†‡						
Normative beliefs about use	−0.22	(0.03)	0.14	(0.02)	0.36	<0.01
Perceived prevalence (chewing)	0.05	(0.03)	−0.08	(0.03)	0.13	<0.01
Perceived prevalence (smoking)	0.08	(0.02)	−0.08	(0.02)	0.16	<0.01
Normative expectations of use	−0.20	(0.03)	0.19	(0.03)	0.39	<0.01
Knowledge about public policies	−0.15	(0.03)	0.07	(0.02)	0.21	<0.01
Support for public policies	−0.21	(0.03)	0.14	(0.02)	0.35	<0.01
Self-efficacy (advocacy skills)	−0.24	(0.03)	0.24	(0.03)	0.48	<0.01
Exposure to advertising	0.07	(0.03)	−0.08	(0.02)	0.15	<0.01

*Estimates are generated from mixed-effects models that are adjusted for city, type of school, sex, and age.
†A higher score on all multi-item scales for all factors indicates *less risk*, or conversely, is more protective.
‡Scale scores from multi-item measures of these factors were standardised before being analysed in the model.
§This difference represents the absolute difference in the standardised scale scores between 6th and 8th grade.

three—perceived prevalence of chewing, perceived prevalence of smoking, and exposure to tobacco advertising. Students in the 8th grade reported more exposure to tobacco advertising and higher perceived prevalence of tobacco use among youth and adults. The magnitude of difference in "risk" between the grades was largest for (in decreasing strength) knowledge about the health consequences of use (for example, "Are all types of tobacco use dangerous?"), beliefs about the social consequences of use (for example, "If you used tobacco, would your parents get angry?"), advocacy skills self-efficacy, normative expectations about tobacco use, normative beliefs about tobacco use (for example, "Is it OK for people your age to try tobacco out of curiosity?"), support for tobacco control policies, social susceptibility to chewing tobacco, and, last, social susceptibility to smoking tobacco. The differential between the grades was the smallest for reasons to use tobacco (for example, "Does using tobacco make a person appear to be more grown up"), the perceived prevalence of chewing and smoking, and exposure to tobacco advertising.

DISCUSSION

Tobacco use among young people in the West typically increases with grade level.[7] In our data from two major cities in India, the opposite was observed.[6] The present study suggests that this unusual difference in tobacco use between grades might be explained, in part, by the distribution of "risk" between grades. For all but three of the 15 risk factors examined here, students in 6th grade scored lower than 8th graders, indicating they were at higher risk, such that they would be more likely to use and to begin using tobacco than those in the 8th grade. Students in the 6th grade, for example, did not understand the negative health effects of tobacco as well as the 8th graders, nor did they believe that there were as many negative social consequences of tobacco use compared to 8th graders. Students in the 6th grade also reported that tobacco use was more acceptable (for example, it is OK for students their age to experiment with tobacco out of curiosity) than students in 8th grade did. Students in the 6th grade were also more socially susceptible to using tobacco (for example, if a friend offered them tobacco, they would accept and use it)—a particularly important risk factor that has been shown in young people to predict onset of tobacco consumption in the future.[14]

This distribution of "risk" between grade levels as it relates to increased tobacco use has also been observed in the West. Just as tobacco use usually increases with grade level, so do a number of psychosocial risk factors for tobacco use, as demonstrated by the Monitoring the Future Study in the USA. This study measures tobacco and other drug use, and associated risk factors, annually and cross-sectionally each year among a large, representative sample of 8th, 10th and 12th grade students nationwide.[15] As grade level increases in this study, social norms about tobacco use become more permissive and tobacco products seem more accessible. In 2004, 85.7%, 82.7%, and 76.2% of 8th, 10th, and 12th grade students, respectively, said they *dis*approved of people who smoked one or more packs of cigarettes a day, while 81% of 10th graders reported it would be easy to get cigarettes if they wanted some, as compared to 60% of 8th graders.[15] Moreover, perceived risk in regards to the harmfulness of tobacco was lowest in this study at ages when initiation is likely to occur.[15] In short, the "risk profile" of the younger cohort in India (6th grade) mimics the "risk profile" of older cohorts in the USA where tobacco use is more prevalent. The 6th graders in India, then, appear to be especially vulnerable to tobacco use, and are more susceptible to outside influences (for example, peers), that might encourage tobacco use. The reverse of this pattern (in regards to tobacco use, psychosocial "risk profile", and grade) is noted in the West.

One particularly critical influence to consider is that of tobacco advertising. In the West, tobacco advertising, marketing, and promotional activities have been repeatedly linked to the onset of smoking among young adolescents, with evidence to suggest that receptivity to tobacco advertising may be a stronger influence on the uptake of tobacco use than tobacco use by family members and peers.[16–18] In this study, 6th graders reported less exposure to tobacco advertising than 8th graders, after adjusting for age, though the magnitude of this difference was small compared to the distribution of other risk factors (table 4). However, exposure to tobacco advertising was related to increased tobacco use among students in the 6th grade—but was *not* among students in the 8th grade (tables 2 and 3). In fact, exposure to tobacco advertising was still significantly related to increased tobacco use in 6th grade, even after adjusting for the 14 other psychosocial risk factors examined here,

suggesting it may be an especially strong risk factor for students in the younger cohort. Though it can be argued that tobacco advertisements in India have been increasingly targeted at youth over the last decade, there is no evidence to suggest that the advertisements are differentially aimed at younger cohorts of youth (for example, 6th graders) as compared to older cohorts (for example, 8th graders).[1] Ultimately, it may be that the 6th graders were more receptive to the messages contained in recent tobacco advertising campaigns, and thus more susceptible to experimentation and regular use as a by-product of exposure and their ''risk profile.''

The influence of advertising on youth tobacco use remains understudied in India, though the climate for tobacco advertising, marketing, and promotional activities in the last few years has changed dramatically. For example, tobacco advertising campaigns in India have become much more youth-focused in recent years.[1] In the mid- to late-1990s, the tobacco industry switched from portraying older adult males as their primary role models in advertising campaigns to younger adult males *and* females.[1] Brand-stretching (for example, sports-wear clothing lines) and product placement in Indian films have also become increasingly popular marketing techniques of the industry. In 2003, the government of India passed new legislation (The Cigarettes and Other Tobacco Products Act, 2003) that, as of May 2004, banned all direct (for example, print media) and indirect (for example, sport sponsorships) advertising of tobacco products across the country. Knowing the ban was imminent, the tobacco industry has pressed hard to promote its products as much as possible in recent years and remains creative in its attempts to diminish the effects of the new legislation.[6]

Alternative explanations for these unusual findings include under-reporting in 8th grade, over-reporting in 6th grade, and/or lack of understanding of questions on the survey by students in either grade. An extensive piloting procedure was used in the early stages of this project to ensure the survey was appropriate for use for students in both grade levels.[6] [12] Modifications were made to ease the survey administration for students, and staff was available to answer questions, as they arose in implementation. The survey was administered confidentially, which has been shown to improve validity and reliability of self-reported data like these.[7] School drop-out rates between 6th and 8th grade are low, so differential attrition by grade level among young tobacco users cannot explain the findings either.[6] Given the data that indicate the doubling of tobacco use rates in Delhi and Mumbai (from 2001 GYTS and 2004 Indian Cancer Society survey), one possible explanation for the differences between 6th and 8th grades is a secular trend linked to a cohort effect.[4] [5] Clearly, since this is a cross-sectional study, longitudinal data are needed to confirm whether the rates of tobacco use in this cohort (6th grade) sustain their differential over the other cohort (8th grade) over time.[6]

The need for tobacco prevention interventions in this age group is clear. Students in the younger cohort (6th graders) may need more immediate and stronger intervention than students in the older cohort (8th graders), contrary to practices in the West. The results of the present study suggest that, conceptually, the framework used to design the intervention programme for MYTRI is reasonably robust, as it accounts for significant proportions of variability between students and schools in tobacco use, especially for 6th graders. With a few exceptions (for example, exposure to tobacco advertising), the association between potential risk factors and tobacco use did not differ by grade in this study, suggesting the conceptual theory underlying this intervention is appropriate for both cohorts. The conceptual framework used to develop Project MYTRI was based on a Western

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What this paper adds

This paper explores possible explanations for why students in the 6th grade might be using tobacco at higher rates than students in the 8th grade in two cities (Delhi and Chennai) in India (reported in an earlier study). Specifically, the paper addresses two research questions: (1) does the association between potential risk factors and tobacco use differ by grade level; and (2) are there differences in the magnitude or distribution of risk factors by grade level? To date, a limited number of studies examining the aetiology of tobacco use in urban Indian youth have appeared in the literature, and none address this important difference observed between cohorts, or grades.

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model of prevention (''social influences model''), with adaptation for use in this urban Indian context.[7] [9] [12] This model, which focuses on changing social norms and increasing social skills to help students identify and resist social influences to use tobacco, seems to be an appropriate approach to tobacco prevention programmes for youth in India as well. Social norms (for example, perceived prevalence of tobacco use) and social susceptibility were strong correlates of tobacco use in this study, for both 6th and 8th grade students. Though the intervention activities in MYTRI address factors in the intra-personal (for example, increasing knowledge about the harmful effects of tobacco) and social-environmental domains (for example, changing or reinforcing healthy social norms about tobacco use), this study suggests the intervention would benefit more from a focus on primarily social-environmental factors, given the correlates of tobacco use which were the strongest in this study. Future Project MYTRI studies will examine the efficacy of our intervention strategy, as well as further our understanding of the aetiology of tobacco use in this population, particularly from a longitudinal perspective, including a more extensive examination of the role that tobacco industry activities may play in the onset of tobacco use among urban Indian youth.

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