

## RESEARCH ARTICLE

# Tobacco Promotion and Availability in School Neighborhoods in India: a Cross-sectional Study of their Impact on Adolescent Tobacco Use

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### Abstract

**Background:** Adolescent tobacco use is a major public health problem. However, there is little information about the impact of tobacco advertising and availability near schools on adolescent tobacco use in India. **Methods:** The various tobacco products and brands available in outlets within 100 meters of two high schools in an Indian town were identified. A stratified random sample of 172 participants from these two schools completed a questionnaire on tobacco use and socioeconomic status. **Results:** Eighteen outlets selling tobacco products were identified. In the two schools the current use of smoked and smokeless tobacco was 9.1% and 17.4% respectively. School location and low socio-economic status of adolescents were associated with tobacco awareness of advertisements ( $p=0.001$ ) and the receipt of a free sample ( $p=0.032$ ). Advertisements on billboards, posters and the receipt of a free tobacco sample were significant factors ( $p=0.031$ ,  $p=0.016$ ,  $p=0.017$  respectively) in current tobacco use. **Conclusion:** In this study a significant proportion of adolescents used tobacco. Tobacco-promotion activities (advertising, the receipt of a free sample), school location and economic status were found to be associated with adolescent tobacco initiation. The local environment should be included in the prevention of adolescent tobacco initiation.

**Keywords:** Tobacco - adolescent - availability - schools - neighborhoods

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### Introduction

Tobacco use (smoked and smokeless) in youth in both low and high countries is a public health concern. India is the world's second largest producer of tobacco and also the second largest consumer of unmanufactured tobacco (Schensul et al., 2012). Tobacco use is the leading cause of preventable death and is estimated to kill more than 5 million people each year worldwide (WHO, 2009). Studies show that environmental, social and psychological factors create a major impact on adolescent tobacco use (Conrad et al., 1992). The availability, accessibility and affordability of tobacco products are key contributors to the level of adolescent tobacco use. Tobacco prevalence among adolescents in India was 14.1% (1) (Bhojani et al., 2009) and in Gujarat was 18.7% (Shah and Jathal, 2003). In India the Control of Tobacco Products Act (COTPA) restricts the sale of tobacco products within 100 meters of schools. The impact of tobacco advertising and availability near schools on adolescent tobacco use in India has yet to be explored. The aims and objectives of the study were: (1) to identify tobacco selling outlets, the tobacco products (smoked and smokeless) sold in these and to count and describe the local tobacco product advertisements within 100 meters of school premises, (2) to establish tobacco products use among male adolescents aged 13-15 years and (3) to

examine the relationship between male adolescent tobacco use and tobacco product advertisement and availability in outlets within 100 meters of school premises.

### Materials and Methods

This cross-sectional study followed methods previously described (Longman et al., 2010) and adopted the following approach:

#### *Recruitment of outlets in school neighborhoods*

Outlets within 100 meters of two high schools in one small Indian town in the state of Gujarat were identified and screened for their tobacco sales activities. One of these schools was in the city centre (School A) and the other suburban (School B).

#### *Sample selection of participating adolescents*

A stratified randomly selected sample of male adolescents aged 13-15 years attending 8th, 9<sup>th</sup> or 10<sup>th</sup> standard at the two high schools, using an online random number generator, was recruited. Male adolescents in these grades not meeting the age criteria were excluded as were girls. A previous study in Gujarat reported more tobacco use in boys (24%) than girls (3.2%) (Shah and Jathal, 2003).

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### Sample size estimation

Sample size was calculated using the sampsi routine and prevalence data reported previously of 24% and 50% (Henriksen et al, 2008). Estimated required sample sizes were n1 (78) and n 2 (78). Including a 10% margin of error the total sample size was 172, 86 from each school.

### Data collection and measures

Tobacco-related activities in each outlet were investigated using a previously described questionnaire (Longman et al, 2010). One section included questions about the outlet licence, the presence of “No Smoking” and “Age Restriction” signage and the smoked and smokeless tobacco products sold (type, brands, price in outlets) whilst the second logged the location and type of advertisements.

With respect to adolescent smoked and smokeless tobacco use, data was collected using a self-administered questionnaire composed of four sections from the Global Youth Tobacco Survey (GYTS) (2008), and the Global Adult Tobacco Survey (GATS) (2009-2010). Questions assessed current specific tobacco use (smoked cigarette and bidi or chewed smokeless tobacco on one or more days of the past 30 days), age of starting specific tobacco use, different products and brands used, sources of tobacco, expenditure on tobacco products and location of use (home, school hostel, bus or street). The source of tobacco included store, paan shop, from a friend or from a family member. Finally, refusal in the last 30 days to sell a respondent smoked and smokeless tobacco because of age was asked.

Questions also included the participant’s age, school grade and social status (India Census, 2001). Social status was measured using asset based questions reporting type of house, toilet facility, fuel for cooking and drinking water supply. The kind of vehicle used for personal transport was also included. Responses to these questions were totaled and dichotomized. Participants with scores below the median score were assigned higher socio economic status whilst participants scoring equal or greater than the median were assigned low socio economic status.

The final section investigated the promotion of tobacco use within 100 meters of each school, including awareness of advertisements of smoked and smokeless tobacco products located at outlets, on billboards and public walls. A question about the offer of free samples of any tobacco product was asked. Maps showing the 100 meter corridor around each school were used to orientate participant responses.

### Ethical approval and confidentiality

A protocol for the study was submitted to the Ethics Committee of Queen Mary University of London for approval. Permission from the Principals of both schools was also sought to conduct the study. The students participated voluntarily and could withdraw at any time. Informed consent was obtained from participants. Instructions about the survey were given by one trained and calibrated data collector. Confidentiality of the information obtained was assured through data coding. To optimize anonymity neither school is identified in the reporting of results.

### Data analysis

Data were analyzed using SPSS v 18. Frequencies for categorical variables and the mean and standard deviation for continuous variables are reported. If the assumption of normality was violated the median is reported. The Chi square test was used to establish the relationship between respondent tobacco use and the proximity of a school to outlets, tobacco availability, advertising and socio-economic status. The significance level adopted was  $p \leq 0.05$ .

## Results

Eighteen outlets selling tobacco products were identified, all around School A. Most commonly these outlets were paan shops and general stores. Of these outlets, 15 claimed to be licensed but did not show the license. Two outlets displayed both “No Smoking” and “Age Restriction” signage whilst eleven outlets had neither sign on the premises. Three smokeless tobacco types (gutkha, zarda and khaini) and two smoked tobacco types (cigarette and bidi) were identified.

### Sample general characteristics

After exclusions due to respondent age 132 (76.7%) responses remained in the analysis. Mean (SD) age of respondent was 13.67 ( $\pm 0.71$ ) in one school and 13.88 ( $\pm 1.12$ ) years in the other. The mean respondent social class score was 7.31 ( $\pm 2.00$ ) in School A and 6.74 ( $\pm 1.23$ ) in school B. Participants from School A were more likely of low socio-economic status compared with counterparts in School A ( $p=0.001$ ) (Table 1).

### Tobacco use

Smoked and smokeless tobacco use totaled 9.1% and 17.4% in both schools. Smoked tobacco prevalence in School A was 9.4% and 5.9% in School B whilst the smokeless tobacco prevalence was 18.8% in School A and 8.8% in School B. Advertisements for smoked tobacco on outlets, billboards, posters, and public places were reported as more widespread than those for smokeless tobacco ( $p= 0.001$ ). Gutkha was more likely

**Table 1. Sample Socio-demographic Characteristics**

Variables	School A F (%)	School B F (%)
Age		
13 years old	29 (45.30)	22 (32.40)
14 years old	27 (42.20)	32 (47.10)
15 years old	8 (12.50)	14 (20.50)
Socio-economic status		
High	18 (28.10)	38 (55.90)
Low	46 (71.90)	30 (44.10)

**Table 2. Tobacco Promotion Advertising and Use**

Variables	Tobacco use F(%)	No tobacco use F(%)	p-value
Promotion			
Free sample receipt	22 (91.70)	72 (67.30)	0.017
Advertising			
Billboards	22 (91.70)	76 (70.40)	0.031
Posters	23 (95.80)	79 (73.10)	0.016
Public walls	21(87.50)	73 (67.60)	0.051

used by adolescents in School A (18.8%) than School B (8.8%). The average weekly spends on smoked tobacco and smokeless tobacco was 1.12 and 2.4 Indian rupees respectively. Whilst 6.8% of adolescents reported it as easy to purchase tobacco products, 9.8% reported being refused a purchase of tobacco products because of their age. Home, school and hostel were the most popular places for tobacco use (15.2%) whilst more purchases of tobacco products were made from the paan shop (10.8%).

#### *Factors associated with tobacco use*

Table 2 shows a significant association between free sample receipt and current tobacco use ( $p=0.017$ ). Awareness of advertisements on billboards and posters were significant ( $p=0.031$ ,  $p=0.016$ , respectively) in current tobacco use although advertisements on public walls had no association with current tobacco use ( $p=0.051$ ). Further exploration showed that respondents of low economic status and attending School A were more likely to report receiving a free sample ( $p=0.032$ ,  $0.001$ , respectively). School A respondents were also more likely to report awareness of advertising in outlets and on billboards, posters and public walls ( $p=0.001$ ). Adolescents of low socio-economic status more likely reported exposure to advertisements on billboards ( $p=0.025$ ).

## Discussion

This study is the first to report the impact of tobacco product availability, advertising and other tobacco-related activity within 100 metres of a school in India on adolescent tobacco use. The role of the tobacco environment and tobacco related activities have been highlighted in this study. Three smokeless and two smoked tobacco products were identified. Enforcement of the tobacco control regulations regarding sales to minors was investigated and variations in its implementation were identified. This study reports the attempted purchase of tobacco by respondents and refusal due to age, not previously reported in any Indian study. A relationship between tobacco use, awareness of advertising on billboards, posters and the receipt of free sample has been identified. Attendance at city centre school was associated significantly with a awareness of advertising in outlets whilst the adolescents of low socio economic status were more likely to report exposure to advertising and to receive a free tobacco sample.

The literature reports adolescent tobacco prevalence in the range from 9 to 18.7% (Sinha, 2006; Christophi et al., 2008; Baramidze et al, 2009; Mpabulungi et al, 2006; Bandason et al., 2010). The impact of the availability of outlets selling tobacco products and socio-economic status on smoking behaviour has been further confirmed (Stigler et al, 2006; Siahpush et al., 2010; Schensul et al, 2012). It is noteworthy to report here that our study was conducted in a small rural town whereas Schensul et al., (2012) reported data from slum in Mumbai. Violation of COTPA legislation with respect of sale of tobacco products within 100 yards of a school has also been confirmed (Schensul et al., 2012). Though respondents reported

being aware of smoked tobacco advertising, smokeless tobacco was more likely used. The use of smokeless tobacco, especially guthka, has been reported previously as due to its cheap price, ease of access and availability as well as an alternative option for tobacco consumption if smoking was not approved (Siahpush et al., 2010; Oswal, 2012). Reviews of tobacco advertising have established that tobacco advertising and promotional activities are important catalysts in the smoking initiation process and impulse buying (Biener et al., 2000; Croucher and Choudhury, 2007; Lovato, 2008; Burton et al., 2012). A previous Indian study established that exposure to tobacco advertisements and receptivity to tobacco marketing was significantly related to increased tobacco use among students (Arora et al., 2008).

Some limitations should be acknowledged. The cross sectional study design precludes inferring causality between the outcomes investigated and independent variables. The study findings may be inferred to this sample alone. According to the India census (2001) there are 12.6 million child labourers (Government of India, 2001). Adolescents who are not attending school were not included. The GYTS also does not include this group. Inclusion of children who do not attend schools would enlarge the sample. A larger, more representative sample size may impact on the strength of the results. Self reported tobacco use was not validated with biomarkers such as CO or cotinine. Reporting tobacco use status among adolescents can be affected by situational factors (Brenner et al., 2003). However, optimization of confidentiality through the use of a self-administered questionnaire reduced bias. Whilst this study has confirmed the role of socio-economic-status in adolescent tobacco use, it has highlighted the role for the tobacco environment around schools. Understanding and addressing adolescent tobacco initiation should take into account both socio-economic status and the local tobacco environment (advertising and free sample offers).

In conclusion, in this study a significant proportion of adolescents used tobacco. Tobacco-promotion activities (advertising, the receipt of a free sample), school location and economic status are associated with adolescents' tobacco initiation. The local environment should be included in adolescent tobacco initiation control.

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