

RESEARCH ARTICLE

Adherence to the Tobacco-Free School Policy in Rural India

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Abstract

Background: In India, 267 million adults use tobacco with prevalence of 35% in rural areas and 13% among those between 15 and 24 years. With 40% of India's population below 19 years, tobacco-free schools (TFS) can be a critical strategy for preventing tobacco-use among youth. This study examined the extent of and factors associated with complete adherence to national TFS guidelines among rural schools in the state of Maharashtra. **Methods:** Trained observers visited 507 rural schools to check adherence to eleven TFS criteria and conducted a cross-sectional survey of school-level indicators. These data were coupled with school-based information from the District Information System for Education (DISE) to analyze factors associated with TFS-adherence. **Results:** Only 11% of schools adhered to all eleven TFS criteria. Majority (72%) prohibited sale of tobacco inside and within 100 yards of the school; 63% displayed no-smoking posters; and 59% banned tobacco use inside premises. However, only 18% consulted with state tobacco advisor and only 28% of schools had tobacco prevention messages on school stationery. Bivariate analysis revealed that complete TFS-adherence was associated with participation of school in sports ($p<0.001$) and extra-curricular competitions ($p<0.001$); internet connectivity ($p<0.005$) and e-learning facilities ($p<0.05$); and teachers' attendance at capacity-building workshops ($p<0.05$). A logistic model identified competitive sports participation (OR=3.27, $p<0.005$) as a key predictor of adherence to the TFS policy. **Conclusion:** This is the first study in India that measures and examines compliance among rural schools with national TFS guidelines; thus filling an existing gap in the tobacco control literature. Schools that provide students and staff with opportunities for overall development seem more likely to implement tobacco-free guidelines. By understanding the hard-to-meet criteria, policy-makers and practitioners can support schools in becoming tobacco-free. Integrating tobacco control programs with overall development goals of the school is one way forward.

Keywords: Tobacco-free schools- rural India- adolescents

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Introduction

India is home to the second largest number of tobacco users in the world after China (Giovino et al., 2012). According to the Global Adult Tobacco Survey (GATS 2016-2017), the country has nearly 267 million tobacco users, with a prevalence of 35% in its rural areas (MoHFW, 2017). Majority (63%) of tobacco users in India consume smokeless tobacco and 24% smoke cigarettes or bidis (a local cigarette made of unprocessed tobacco flakes wrapped in tendu leaves) (MoHFW, 2017). Previous studies have shown that each year tobacco use reportedly causes a million deaths in India (Jha et al., 2008), leading to two in five (40%) of all cancer deaths, and 90% of all oral cancer deaths (Sullivan et al., 2014; Shimkhada and Peabody, 2003). The direct and indirect costs of tobacco-related morbidity and mortality is estimated at US\$ 23 billion annually (PHFI, 2014) which exceeds the combined government and state expenditure on public health, water supply, and sanitation (Kings Health Partners Cancer Centre, 2014).

The GATS (2016-2017) also reported the prevalence of

tobacco use among youth aged 15 to 24 years to be 13% (MoHFW, 2017). However, the Global Youth Tobacco Survey (GYTS) conducted in 2009, found tobacco use of 15% among adolescents aged 13 to 15 years, with the prevalence of smoking among boys almost three times higher than that of girls (MoHFW, 2009). The GYTS also showed that 45% of these male adolescent users had initiated bidi-smoking before the age of 10 years (Gajalakshmi and Kanimozhi, 2010). With 40% of the population in India below the age of 19 (Government of India Census, 2011), tobacco control efforts are critical in the adolescent age group in order to reduce the burden of tobacco-related morbidity and mortality in the country.

In 2003, the Parliament of India enacted the Cigarettes and Other Tobacco Products Act (COTPA) which exclusively focused two of its provisions on tobacco control among adolescents and youth viz. ban on sale of tobacco products to and by minors (persons below 18 years) and sale of tobacco products within 100 yards of all educational institutions (Ministry of Law and Justice, 2003). In 2009, the national Ministry of Health and Family Welfare released comprehensive guidelines for achieving

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tobacco-free schools and educational institutions (MoHFW, 2009). The Central Board of Secondary Education took this decision forward to implementation by crafting 11 criteria for a tobacco-free school (TFS), and making it mandatory to be followed by all its affiliated schools (CBSE, 2009).

While these eleven criteria offer scope for prevention and control of tobacco use among students by addressing informational needs, assuring enforcement of existing laws and changing the organizational environment of the school towards being tobacco-free, it is the routine implementation of these guidelines in every school that will lead to a tobacco-free society for Indian youth. Therefore, the purpose of this study was to examine the extent of adherence of rural schools with the eleven tobacco-free school criteria; identify which criteria were fulfilled by majority of schools and which ones were not; and determine school-level factors associated with complete adherence to TFS criteria. A better understanding of adherence will facilitate proper implementation of TFS guidelines in the rural setting.

Materials and Methods

Study setting

Maharashtra is the second-most populous Indian state, split into six divisions and 35 districts (Government of India, 2011). It is also one of the five major tobacco-producing states in India, with 16.7% of total agricultural land (1,950 hectares) under tobacco cultivation (Ministry of Agriculture, 2013). Even though a third of all adults and 13% of adolescents in the state use tobacco, mostly in smokeless form (MoHFW 2010 and 2009), compliance with the COTPA, especially the provisions focusing on adolescents remains inadequate (Rimal, 2014). Established in 2002, Salaam Mumbai Foundation (SMF), is a not-for-profit organization that works in 30 districts in Maharashtra, training teachers, school representatives and local stakeholders to make their schools and villages

tobacco-free (SBF, 2014).

Sampling and data collection

Of the total 100,084 schools in Maharashtra, all of which are expected to comply with state tobacco control policies, 68% are completely managed by the government, 20% are privately owned but receive government aid for operations, 12% are completely private-owned and operated. A total of 13,721,520 students, mostly from lower-socioeconomic status families, are enrolled in government-run schools in Maharashtra. One in three government schools in the state do not have a separate toilet for female students and 8% lack drinking water facilities (MPSP and UNICEF, 2012). Government schools have a rigid bureaucratic structure, teachers have low motivation translating into lower expectancy from students, hence affecting their school performance (Khandagale et al., 2013; Ramachandran et al., 2005).

Based on recommendations from the Government District Education Officers, logistical ease, and travel and time costs, SMF staff used a non-probability convenience sampling technique to select 507 schools, majority of which were government-managed, from 20 districts across Maharashtra. SMF staff were trained to apply the 11-point criteria of the national TFS guidelines. They visited all 507 schools, observed and recorded each school's adherence with the 11 TFS criteria, and also gathered data on school-level variables from the principal or an assigned official representative.

The study was approved by the Institutional Ethical Review Board of Narotam Sekhsaria Foundation and Salaam Mumbai Foundation. Prior consent was gained from representatives of each school followed by notification about observational visits at least a week in advance. School visits within a specific district were executed within a ten-day period, and since both school principals and data collectors in different districts were not aware of the selected list of schools in each district, the chance of principals informing each other about any

Table 1. Description of the 11-Point Criteria for Tobacco-Free Schools (TFS) and Percent of Schools That Met Each Criteria

No	Description of tobacco-free school criteria	Percent of Schools that met criteria (n=507)
1	Posters in school that state smoking in and around this area is not allowed	63 % (318)
2	Posters that states the ill effects of tobacco and tobacco control law inside the premises	45% (226)
3	Principal has a copy of directives/circular based on the 2003 law	52% (262)
4	Presence of a banner or poster near the entrance of the school which states that this is a tobacco free education space or tobacco free school	31% (155)
5	Tobacco selling is completely banned inside the premises and within the radius of 100 yards from school / educational institutions	72% (365)
6	No tobacco use inside the school	59 % (298)
7	Tobacco control committee is in place and quarterly meetings are conducted of the same	31% (157)
8	Tobacco control is a part of (the usual) regular school health activities	31% (156)
9	School stationary has tobacco related messages	28% (142)
10	School, principal or staff or students are awarded for tobacco control activities	22% (112)
11	Availed any advice, consultation from the state appointed state tobacco advisor	18% (89)
	Complied with or met all of the 11 criteria above	11% (55)
	Complied with none of the above criteria	9%

impending visit and the possibility of any systematic overestimation of adherence was highly unlikely. Data was collected from June to December, 2015.

Study instruments

SME staff used a checklist of the 11 criteria for TFS guidelines (see Table 1). The 11 TFS criteria provide direct information such as posters and signage, and maintaining a copy of the COTPA law; require enforcement such as banning sale and use of tobacco in and around schools; address organization culture vis-à-vis tobacco control committees, regular activities, awards for their tobacco control efforts; and calls for convergence with health department by asking schools to consult with the state tobacco control officers.

Data on school-level indicators, gathered to ensure coverage of possible factors associated with TFS compliance, included (i) demographics of students and teachers; (ii) infrastructure and amenities, involvement of the school management, and presence of a parent teacher association (PTA), and (iii) achievement indicators such as participation in sports and extra-curricular competitions, number of awards won by the school, guest lectures, and workshops attended by teachers. Demographic information on student and teacher variables for all the selected schools were obtained from the District Information System for Education (DISE), government-run software system that collects data on school-related variables from across all Indian states (DISE, 2009).

Information on student caste groups were also obtained from the DISE. Students belonged to one of the four caste groups viz. scheduled castes, scheduled tribes, other backward castes, and general castes. The first three caste groups are constitutionally recognized for affirmative action schemes owing to their history of marginalization and subsequent socio-economic disadvantage, while members of the general caste do not qualify for such preferential treatment.

Data analysis

Data was entered in Microsoft Excel 2007, and then analyzed using the SPSS software version 16.0. First, descriptive frequencies for adherence to the 11 TFS criteria, and all school-level variables were generated. Second, bivariate analysis was conducted wherein all nominal school-related variables were tested for association with adherence to TFS criteria using Chi-square statistic; t-test was employed for interval-level variables. Finally, variables that were significant at $p < 0.05$ level in the bivariate analysis were included in a logistic regression model to find the best predictors of adherence.

Results

School Description

Most schools were government-managed (93%), had 'pucca' or concrete infrastructure (94%), used a regional language such as Marathi or Urdu as their medium of instruction (81%), and had a mean number

of 7 classrooms. Almost 72% of all schools had student enrollment of 200 or less, with a mean enrollment of 184, and an average of 92 of both male and female students. On an average, most students in each school belonged to other backward castes (86), followed by general caste (42), scheduled castes (29) and tribes (27). Almost 90% of schools had a total of 10 teachers or less, with the mean number of male, female and total teachers being 4, 3 and 7 respectively. Almost all schools surveyed (98%) had toilets, with a separate toilet facility for female students.

Eight in ten schools had playgrounds; 61% had computers; while less than 20% reported having internet connectivity and an E-learning facility which includes information technology-based equipment. Around 96% of all schools reported having an active trust or management committee, with a minimum of 4 meetings held every year, and almost all schools had a parent teacher association.

Nearly half (46%) of all schools had participated in sports, while a third (32%) reported participation in extra-curricular competitions. In 87% of the schools, teachers attended capacity-building workshops and 72% conducted knowledge-building guest lectures for their students and staff. In the last 3 years prior to the survey, teachers in 16% of schools and 13% of schools themselves had received government awards for tobacco control.

Adherence to TFS criteria

Of 507 schools, only 11% adhered to all 11 TFS criteria; 80% complied with anywhere between one to ten criteria; and 9% did not fulfill any single criteria (see Table 1). For criterion that provided direct information about tobacco, 63% of schools displayed posters stating that smoking is not allowed in and around the premises; half (52%) reported having a copy of the tobacco-free school directives; and less than half (45%) displayed posters inside premises that stated the ill effects of tobacco and described the tobacco control law; and only 31% displayed a 'tobacco-free school' signage near the entrance of the school.

With respect to enforcement-related criteria, 72%; prohibited sale of tobacco inside and within 100 yards of school premises, and 59% banned tobacco use inside school premises. In terms of organizational criteria, only 31% of the schools had a tobacco control committee and integrated tobacco control into regular school health activities; 28% schools reported having stationery with tobacco control messages; and only 22% of schools had seen students/ teachers/ other staff receive any awards for tobacco control initiatives. Only 18% of schools consulted with state tobacco control officers, making this the least followed criteria.

Differences between adherent and non-adherent schools

Bivariate analysis found that a significantly higher proportion (33%) of schools that adhered with all 11 criteria reported having internet connectivity than non-adherent schools (15%) ($p < 0.001$), and had an E-learning center (25%) versus 15% in non-adherent schools (15%) ($p < 0.05$) (see table 2). Adherent schools were more likely to have participated in sports (80% versus

Table 2. School-Level Characteristics and Adherence to TFS Criteria

Variables	Total number of schools (n=507)	Schools that adhered the 11-point TFS criteria (n=55)	Schools that did not adhere the 11-point TFS criteria (n=452)	p-value
Type of School				
Government-managed	472 (93%)	48 (87%)	424(94%)	0.071
Private aided or Private un-aided	35 (7%)	7 (13%)	28 (6%)	
Type of infrastructure				
Pucca	478 (94%)	55 (100%)	423 (94%)	0.053
Katcha	29 (6%)	0 (0%)	29 (6%)	
Medium of instruction				
Semi-English (science subjects taught in English)	98 (19%)	6 (11%)	92 (20%)	0.094
Regional language	409 (81%)	49 (89%)	360 (80%)	
Number of classrooms				
1-5	147 (29%)	12 (22%)	135 (30%)	0.333
6-9	313 (61%)	39 (71%)	274 (62%)	
10 and above	47 (9%)	4 (7%)	43 (9%)	
Mean number of students (Range; SD)				
Male students	92.16 (0-1651; 147.47)	88.84 (0-373; 64.61)	92.56 (0-1651; 154.59)	0.86
Female students	91.75 (0-1399; 133.27)	86.76 (12-220; 52.77)	92.36 (0-1399; 139.97)	0.769
Total students	183.91 (2-3050; 268.9)	175.6 (25-561; 110.01)	184.92 (2-3050; 282.25)	0.808
Mean number of students by caste (Range; SD)				
General Caste	42.47 (0-1914; 111.56)	45.2 (0-352; 82.32)	42.14 (0-1914; 114.68)	0.848
Scheduled Caste (SC)	28.74 (0-309; 38.37)	21.91 (0-84; 20.75)	29.57 (0-309; 39.92)	0.162
Scheduled Tribe (ST)	26.98 (0-651; 56.54)	31.16 (0-168; 42.45)	26.47 (0-651; 58.04)	0.561
Other Backward Caste (OBC)	86.04 (0-1975; 157.93)	78.76 (0-277; 66.81)	86.92 (0-1975 ;165.54)	0.72
Mean number of teachers (Range; SD)				
Male teachers	4.32 (0-60; 4.97)	4.62 (0-14; 3.21)	4.28 (0-60; 5.14)	0.638
Female teachers	2.67 (0-99; 5.08)	2.07 (0-6; 1.77)	2.75 (0-99; 5.34)	0.353
Total number of teachers	6.99 (1-110; 7.94)	6.69 (1-19; 3.36)	7.03 (1-110 ; 8.33)	0.765
Amenities in school				
Active management trust	486 (96%)	55 (100%)	431 (95%)	0.103
Parent Teachers Association	500 (99%)	55 (100%)	445 (98%)	0.353
Playground	427 (84%)	50 (91%)	377 (83%)	0.15
Computers	308 (61%)	38 (69%)	270 (60%)	0.18
Internet connectivity	86 (17%)	18 (33%)	68 (15%)	0.001
E-learning center	80 (16%)	14 (25%)	66 (15%)	0.037
Toilet facility	499 (98%)	54 (98%)	445 (98%)	0.880
Toilet facility for female students	491 (97%)	53 (96%)	438 (97%)	0.829
School achievement indicators				
Participation in sports competitions	254 (50%)	44 (80%)	210 (46%)	0
Participation in extra-curricular competitions	162 (32%)	29 (53%)	133 (29%)	0
School teachers have attended workshops	440 (87%)	53 (96%)	387 (86%)	0.026
Guest lectures conducted in school	363 (72%)	38 (69%)	325 (72%)	0.662
Receipt of government awards by teachers in past 3 years	82 (16%)	10 (18%)	72 (16%)	0.668
Receipt of government awards by school in past 3 years	67 (13%)	9 (16%)	58 (13%)	0.469

46%) and extra-curricular competitions (50% versus 29%) ($p < 0.001$). This type of schools was also more likely to report teachers having attended capacity-building workshops ($p < 0.05$). No significant differences were found between adherent and non-adherent schools on the

type of school, infrastructure, numbers of students and teachers, caste group, presence of school trust and PTA, playground or toilet facilities.

As shown in Table 3, logistic regression found that schools participating in sports competitions were three

Table 3. Factors Associated with Adherence to All Eleven TFS Criteria

Variables	Odds ratio (OR)	95% Confidence Interval (CI)	p-value
Internet connectivity in school (No 0, Yes 1)	1.87	(0.88, 3.96)	0.101
E-learning facility in school (No 0, Yes 1)	0.98	(0.44, 2.21)	0.98
School participation in sports competitions (No 0, Yes 1)	3.27	(1.55, 6.93)	0.002
School participation in extra-curricular competitions (No 0, Yes 1)	1.48	(0.79, 2.77)	0.218
School teachers attended workshops (No 0, Yes 1)	2.92	(0.67, 12.67)	0.151

times more likely (OR=3.27, $p<0.05$) to have adhered to all 11 TFS criteria, making participation in sports the strongest predictor of compliance with the TFS policy.

Discussion

This is the first cross-sectional study to examine adherence among rural schools with the national, 11-point tobacco-free school (TFS) policy, highlighting a major gap in the tobacco prevention literature. While school-based prevention activities continue to be an important approach, an understanding of how to effectively intervene within the school context is clearly lacking, making this study relevant for tobacco control practice in India.

Most published literature on tobacco-free schools comes from the United States of America (U.S); describing how several states have adopted and implemented such policies, and linking this with decrease in smoking among adolescents and youth (Gollub et al., 2014; Summerlin-Long et al., 2008; Peck et al., 1993). Evidence shows that classroom education in isolation is not effective; instead a comprehensive school health education program, tobacco-free policies, positive role models, cessation support and community programs that involve parents, mass media and local organizations appear to enhance and sustain the effectiveness of school-based smoking prevention efforts (Department of Health and Human Services, 2005).

Most Indian studies have examined prevalence of tobacco use among adolescents (Narain et al., 2011; Sinha et al., 2007) or prevention and control through various education and cessation programs (Sidhu et al., 2016; Stigler et al., 2007). A few studies have examined compliance with the COTPA provisions of prohibiting tobacco use and sale within 100 yards of educational institutes (Mistry et al., 2015; Elf et al., 2013). Selvavinayagam (2010) examined the implementation of 7 out of 11 tobacco-free criteria in educational institutions in the southern state of Tamil Nadu and cited 2000 institutes as tobacco-free, describing implementation challenges such as difficulty in cooperation from enforcement authorities and tobacco vendors, and ensuring motivation among stakeholders.

In this study, majority (72%) of schools prohibited sale of tobacco inside and within 100 yards of the premises. This finding differs from a recent study in urban cities in Maharashtra (Rimal, 2014) that reported sale of tobacco within 100-yards of two-thirds of observed institutions. This difference could be attributed to the rural setting, which is remote, unlike schools in many urban areas that are located in marketplaces clustered with shops including

those that sell tobacco.

Close to one-third of schools complied with TFS criteria that demonstrated organizational culture such as setting up tobacco control committees and integration of tobacco-related activities in routine health programs (31%), placing key messages on school stationary (28%) and awarding staff and students for tobacco control efforts (22%). Informal discussions with school principals revealed barriers for implementing these organizational criteria, including time constraints, and difficulty in communicating and coordinating with external stakeholders and internal staff. In many cases, school stationary was purchased from approved businesses and printing special tobacco messages on this preset order would incur additional and often unaffordable costs, acting as a deterrent.

Less than 20% of schools consulted a state tobacco officer for any inputs illustrating lack of coordination between the education and health department. School principals informally discussed how the state officer was often unavailable or had not set any formal appointments for telephone calls, and did not follow up on implementation of the TFS policy. Clearly, active communication channels and mechanisms have to be established for convergence between designated health officers and schools for both adoption and sustenance of the tobacco-free school policy.

Schools that encouraged student participation in sports and extra-curricular competitions, provided capacity-building workshops for staff, and ensured internet connectivity and e-learning facilities, were more likely to adhere to all 11 TFS criteria. It is well established that student participation in such sports and extra-curricular activities facilitates acquisition of positive social norms and connectedness to the institution (Coleman, 2006), and when adolescents feel connected to their school they are less likely to use substances, engage in violence, or initiate sexual activity at an early age (Mahoney et al., 2003). Moreover, discussions with SMF program staff revealed that schools with supportive principals who create an enabling environment for a designated teacher, and focus on overall development and capacity-building of both student and staff are more likely to become tobacco-free. These findings point to the importance of a strong organizational culture within a school that facilitates students and staff to achieve shared goals i.e. tobacco control.

Further bivariate analysis revealed that schools with a higher proportion of general caste students (56.04) and lower proportion of scheduled caste and tribe students, higher total teacher strength (mean: 8.17), which ensured

capacity-building workshops for teachers, and had won higher number of government awards (p value <0.05) were more likely to have participated in sports competitions. Additionally, schools where teachers attended an average of 2.65 workshops or higher tended to participate in sports competitions (OR=1.19, $p<0.001$). So, it may be possible that even though most government schools serve low-income status students, some of the schools that fared better in terms of adherence to the TFS policy may be in a relatively higher socio-economic status bracket. It is also likely that schools without participation in sports or extra-curricular competitions could be skeptical of the efficiency of such activities, especially in times of budget cuts, and appraise them through the lens of academic achievement (McNeely et al., 2002), thus making the implementation of school-based tobacco prevention and control programs an additional burden, with little or no value to the overall goal of academic success.

Findings of this study warrant further research with multiple stakeholders to gain an in-depth understanding of enablers and barriers for adherence with the national TFS policy. Studies should also examine the association between participation in sports and extra-curricular events, emphasis on teacher-training and overall development and adherence to TFS criteria. Finally, future research must clarify the relative importance of school-based approaches versus multi-level community interventions for tobacco prevention among adolescents and how the two can be synergized, especially in resource-poor contexts.

This study has its set of limitations. The data were collected from a majority of government-run schools in rural areas of Maharashtra state making the findings difficult to generalize across all schools or states in India. Convenient sampling could have introduced selection bias, while partial reliance on self-report by a designated school representative could also be a source of bias.

With only one in ten rural schools meeting the TFS criteria, much work remains to be done in the area of tobacco prevention and control for adolescents in India. Principals, teachers and school management will need to be supported to meet difficult criteria and create an organizational culture that supports tobacco control. This can be ensured through convergence and communication between policy and programmatic staff of health and education departments. Tobacco prevention agencies and practitioners should train designated principals and teachers in becoming leaders of tobacco control; sensitize school management and community stakeholders around the efficacy of TFS policy; connect tobacco control to overall school development; and devise sustainable solutions to help schools become tobacco-free.

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Declaration of Interests

There is no conflict of interest in the conduct of this study.

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