

Compliance with smoke-free legislation and smoking behaviour: observational field study from Punjab, India

Sonu Goel,¹ Deepak Sharma,² Rakesh Gupta,³ Vini Mahajan³

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¹School of Public Health, Post Graduate Institute of Medical Education and Research, Chandigarh, India

²Department of Community Medicine, Government Medical College, Chandigarh, India

³Department of Health and Family Welfare, Government of Punjab, Punjab, India

Correspondence to

Dr Sonu Goel, Additional Professor of Health Management, School of Public Health, Post Graduate Institute of Medical Education and Research, Chandigarh; sonugoel007@yahoo.co.in

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ABSTRACT

Background Indian smoke-free legislation requires prohibition of smoking at public places and owners of public places to display 'no smoking' signages.

Aims and objectives The study aims to assess the compliance of public places with smoke-free legislation and determine the factors associated with active smoking in public places.

Methodology This was a cross-sectional analytic observational quantitative survey conducted by a team of trained field investigators using a structured observational checklist across 6875 public places in Punjab state of India. The study was carried out over a period of 3 years.

Results A total of 6875 public places across 22 districts of Punjab were observed. The overall compliance to smoke-free law in Punjab was 83.8%. The highest overall compliance was observed in healthcare facilities (89.6%) and least in transit stations (78.8%). Less active smoking was observed in public places where display of 'no smoking' signage compliant with smoke-free law of India was present (adjusted OR 0.6). Further, there was a positive association between active smoking and places where the owner of public places smoked (OR 5.2, CI 2.5 to 11.1).

Conclusion More than 80% of the public places in a jurisdiction in north India were compliant with the smoke-free legislation of India. 'No smoking' signages displayed as per legislation have an effect on curbing smoking behaviours at public places. It is recommended that policymakers should focus more on implementing the smoke-free law at transit sites and structured training sessions should be organised for owners of workplaces.

INTRODUCTION

India has the highest proportion of tobacco users in the world. Approximately one million people die every year in the country due to this leading preventable cause. India became a party to the WHO Framework Convention on Tobacco Control in the year 2005 and has also promulgated Cigarettes and Other Tobacco Products Act (COTPA 2003) and subsequent rules, 'Prohibition of smoking in public Places rules' (2008), in its commitment towards tobacco control efforts. However, the legislation requires monitoring for its effective implementation in order to ensure whether legal provisions are being followed, so that decisions can be used for midcourse correction.¹²

Since the enactment of COTPA 2003, studies have been conducted in India to measure its compliance.³⁻⁶ However, most of these studies have been conducted in a small number of public places or cover a specific geographical region,

thus are not representative. Further, these surveys do not measure the association among multiple compliance indicators and smoking in public places.^{7,8} A review of various studies conducted in India by Kumar *et al* reported that 51% of places demonstrated full compliance with smoke-free law.⁴ Other studies done in India have reported compliance ranging from 23% to 91%.⁷⁻⁹ Internationally, studies report compliance to smoke-free laws ranging from 75% to 91%.¹⁰⁻¹²

There has been limited evidence about the relationship between effective implementation of legislation regarding smoking restriction at public places with reduction of smoking behaviour. Okoli *et al*, in their study in Canada, studied the effect of an outdoor smoke-free law in parks and on beaches and reported that there was a significant decrease in observed smoking rates in all venues from prelaw to 12 months post law.¹³ Chapman *et al* estimate the contribution of smoke-free workplaces to the declines in cigarette consumption in Australia and the USA. They reported that smoke-free workplaces are currently responsible for an annual reduction of 602 million cigarettes.¹⁴ Jimenez-Ruiz, in a study conducted in Spain, reported that the prevalence of exposure to environmental tobacco smoke decreased from 49.5% in 2005 to 37.9% in 2007 (22% reduction) following implementation of smoke-free laws.¹⁵ Wakefield in the USA reported that the restrictions on smoking and bans on smoking in public places may reduce teenage smoking.¹⁶

Smokers' behaviour is influenced in part by their understanding of smoke-free legislation. Signages help in filling this gap and thus should increase awareness. Research shows that there are significant gaps in knowledge related to the effect of smoke-free signage display on smoking behaviour. Coady *et al* studied the impact of New York City's graphic point-of-sale (POS) tobacco health warning signs on adult current smokers' behaviour. It was reported that signage implementation was associated with a doubling in the awareness of health warning signs and an 11% increase in stimulating thoughts about quitting smoking.¹⁷ Li *et al*, in a four-country study (Australia, Canada, the UK and the USA), reported that there was a significantly positive association between reported exposure to POS antismoking warnings and interest in quitting and prospective quit attempts.¹⁸

To the best of the authors' knowledge, there has been no research in the medical literature as of yet showing validity of indirect indicators (like smell of smoke, finding cigarette stubs at public places) as a proxy to active smoking at public places. Also no studies have reported effect of smoking behaviour



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of the owner of public places (government buildings, educational institutions, healthcare facilities, transit stations, restaurants) on people actively smoking at the site. Against this background, the study was conducted to assess the compliance of public places to smoke-free legislation and to find out the factors which predict active smoking in public places.

MATERIALS AND METHODS

Study design

This was a cross-sectional study conducted in all the 22 districts of Punjab, India, between 2012 and 2014 (3 years).

Study settings

General

The state of Punjab is situated in the northwest India with a total area of 50 362 km² and population of 27 704 236 (Census, 2011). The state has 22 districts each under the administrative control of a district collector. The rural area of a district is subdivided into Tehsils (n=79), Tehsil into blocks (n=143) and block into revenue villages (n=12 278). The urban area comprises Zila Parishads (n=22), Municipal Committees (n=136), towns (n=168) and wards. Rural area constitutes approximately 62% of the total population of a district.

Tobacco control

The state of Punjab in India has been leading in tobacco control efforts, complying by the rules and regulations of the COTPA Act, 2003. Since 2010, Punjab has taken various measures and issued notifications for effective implementation of Tobacco Control Act. It has constituted State-Level and District-Level Monitoring Committees to monitor the implementation of the act. Stakeholders from different departments have been involved. Anybody found smoking in a public place including the owner of the public place is fined as per the law. These efforts have led to declaration of Punjab as first large 'Tobacco Smoke Free' state of India in the year 2015. In Punjab, Global Adult Tobacco Survey 2009–2010 reported that 32.1% of adults were exposed to secondhand smoke at home (35.3% men and 28.4% women).

Study sites

It includes the public places as defined under the Indian Smoke Free act within each of the 22 districts of Punjab. These include (1) restaurants and bars, shopping malls; (2) government buildings (banks, court, public offices); (3) educational institutions (government and schools from 1st till 12th grade, and government/private universities and colleges); (4) healthcare facilities (public/private hospitals/clinics); and (5) transit stations (railway stations, bus stations and airports). Transit points are defined as places where people either board or disembark a public transport system and stay for a short duration of time.

Sample size

The sample size for the study has been calculated based on existing literature.¹⁹ Based on expected compliance rate of 92% (based on a cross-sectional study conducted by Goel *et al* in Mohali district of Punjab⁹), margin of error 1% at 80% power, non-response rate of 5% and design effect of 2.5, a sample of 7400 public places was calculated.

Sampling technique

Stratified simple random sampling methodology was used to attain the desired sample size. The sample size was proportionately divided into urban and rural areas. For rural areas, five subcentre villages (village having a peripheral-level health facility) were randomly selected from each of the 147 blocks in Punjab. Similarly, for urban areas, two wards were selected from each of the 168 towns. Thus, a total of 735 villages and 336 wards were visited. In each of the selected village/ward, all the public places were enrolled for the study. The list of blocks (rural) and towns (urban) is given as online supplementary appendix 1.

Study tool

A structured observational checklist (online supplementary appendix 2) based on an existing guide was used to record the findings.¹⁹ It included variables like active smoking in the public place, display of signages, evidence of recent smoking like butts/bidi ends, smell of smoke and the presence of smoking aids. It is the responsibility of the owner of the public place to ensure compliance to these indicators including placement of signages. This checklist has been used in prior studies conducted by the principal investigator and other investigators in India.^{4 8 9}

Data collection

A team of two research investigators, who have conducted data collection in the past for a similar study conducted by a principal investigator,⁹ were further trained on smoke-free law and its provisions, along with filling of standard checklist used for the study. On-site training was also provided during data collection at regular intervals to maintain quality of data collection. Each of the sampled public places was visited by trained field investigators on weekdays at an unannounced timing in order to capture typical behaviour. Informed consent of the incharge of the public places was obtained prior to data collection. No interaction was done with anyone at the sampled public place except with the institute in charge. In the government buildings and educational institutions, the team visited during the office timings (9:00 to 17:00) and school hours (8:00 to 14:00), respectively. In healthcare facilities, visits were done from 10:00 to 11:00 and 16:00 to 20:00. The transit points, shopping malls, bars and restaurants were visited during the busiest hours (evening hours). The average time spent at each public place was from 20 min to half an hour depending on the area covered.

Operational definitions

'Smoking' means smoking of tobacco in any form whether in the form of cigarette, cigar, bidis or otherwise with the aid of pipe, wrapper or any other instrument. 'Public place' as defined by COTPA 2003 means any place to which the public have access, whether as of right or not, and includes auditorium, hospital buildings, railway waiting room, amusement centres, restaurants, public offices, court buildings, workplaces, shopping malls, cinema halls, educational institutions, libraries and public conveyances which are visited by general public but does not include any open space.²⁰ Any pictorial, graphical or textual message displayed in a public place, which warns that smoking is prohibited in a public place, was recorded as a 'signage'. Signages as prescribed by COTPA for size, textual content, colour, font and design were recorded as 'smoke-free-compliant signage'. The presence of 'indirect indicators' of smoking at public places was defined as 'any place visited by general public where "no smoking" signage was not displayed, there is a presence of smell

of cigarette/bidi smoke and/or cigarette/bidi stubs are found littered’.

Quality control

To avoid the personal bias, all the observations were done by the research investigators trained in filling the observation checklist. The principal investigator along with State Program Officer, Tobacco Control Cell Punjab and Chief Medical Officer of district visited 10% of the sampled facility and independently cross-checked the findings based on the same observational checklist provided to field investigators. The visit was done on same day for ensuring robustness of monitoring. The results revealed 100% congruence of findings between the research field investigators and principal investigator.

Statistical analysis

The data were double entered and coded in MS-Excel and analysed using SPSS V.17 statistical package. Associations between independent variables and dependent variables were analysed using bivariate analysis to identify factors which are significantly associated with ‘active smoking’. Adjusted ORs were assessed by logistic regression models to analyse the association between ‘active smoking behaviour’, which is the dependent variable of interest, and other independent variables, namely ‘no smoking signage’, ‘no smoking signage’s complaint with smoke-free law of India’, ‘presence of smell of smoke in a public place’, ‘presence of cigarette butts’ and ‘presence of smoking aids’. The ‘average compliance’ of the smoke-free law was calculated by adding up the values of ‘individual compliance indicators’ and dividing it by the total number of indicators. The study was ethically approved by the State Tobacco Control Cell, Punjab and Institute Ethics Committee of PGIMER, Chandigarh.

RESULTS

Out of the sampled 7400 public places, the data were collected and analysed from 6875 public places, with the response rate of 92.9%. The reason for non-response was refusal of permission by the owners of some public places. Of the 6875 public places, 1052 (15.3%) were restaurants and bars, 2074 (45.5%) were educational institutions, 836 (12.2%) were transit points,

1717 (25%) were government buildings and the remaining 1196 (17.4%) were healthcare facilities.

The overall compliance to smoke-free law in the state of Punjab was 83.8%. The highest compliance was observed in healthcare facilities (89.6%) and least in transit stations (78.8%). Among the 6875 public places, people were observed to be smoking in 145 public places (2.1%). Of the 1196 healthcare facilities surveyed, 85.6% displayed ‘no smoking’ sign compliant with smoke-free law of India (table 1).

The binary association revealed that smoking was comparatively less prevalent in public places where there was display of ‘signages’ (1.9%). Similarly, less proportion of smoking was observed in public places which had ‘signages’ displayed at the main entrance or at conspicuous sites. Of 5005 public places where signages were compliant with law with respect to content, design and language, 81 sites (1.6%) had people which were found actively smoking. Also, 44.6% of overall smokers were observed in public places where owners themselves smoked at the entrance or exit (table 2).

The logistic regression model revealed that the significant positive predictors of ‘active smoking’ were sites where owner of public place smoked (OR 5.2, CI 2.5 to 11.1); presence of smell/ash (OR 7.2, CI 4.3 to 12.0) and presence of cigarette butts (OR 4.6, CI 2.7 to 7.6). Significantly more smoking was observed in transit points (OR 2.3, CI 1.3 to 4.2) compared with other healthcare facilities. In places where the name of reporting officer was mentioned on the signage, there were lower odds of finding people with active smoking (OR 0.6) (table 3).

DISCUSSION

This is the first study to investigate the adherence of ‘smoke-free law’ using a standard checklist in all the districts of a northern state of India. The first aspect of our study, which was measuring overall compliance to smoke-free law in public places of the state, comprised assessment of various parameters, such as observing active smoking behaviour, display of ‘no smoking’ signages and proxy evidence of active tobacco usage. The results demonstrate that >80% of the public places in the northern state of Punjab were compliant with the smoke-free legislation

Table 1 Compliance with specific indicators of smoke-free legislation at different public places in Punjab, India

Type of public place	Restaurants and bars, shopping malls (n=1052)	Educational institutions (n=2074)	Transit stations (n=836)	Government buildings (n=1717)	Healthcare facilities (n=1196)	
1	Absence of active smoking in public place	1031 (98)	2045 (98.6)	792 (94.7)	1681 (97.9)	1181 (98.7)
2	Presence of ‘no smoking’ signage	804 (76.4)	1740 (83.9)	646 (77.3)	1409 (82.1)	1065 (89.0)
3	Display of ‘no smoking’ signage at main entrance and other conspicuous places	747 (71.0)	1644 (79.3)	604 (72.2)	1334 (77.7)	1024 (85.6)
4	‘No smoking’ signage complies with the law (in contents design, language)	703 (66.8)	1439 (69.4)	591 (70.4)	1277 (74.4)	1000 (83.6)
5	Name and phone number of the reporting officer written on signage	339 (32.2)	937 (45.2)	376 (45.0)	788 (45.9)	709 (59.3)
6	Absence of smell or ashes	904 (85.9)	1994 (96.1)	593 (70.9)	1572 (91.6)	1109 (92.7)
7	Absence of cigarettes butts or bidi ends at public place	1048 (99.6)	2074 (100)	836 (100)	1714 (99.8)	1196 (100)
8	Absence of smoking aids (ashtrays, matchboxes and lighters)	986 (93.7)	2047 (98.7)	671 (80.3)	1649 (96)	1173 (98.1)
9	Absence of active smoking by owners/incharge of public places	1042 (99)	2057 (99.2)	825 (98.7)	1703 (99.2)	1192 (99.7)
	Average compliance (%)	80.3	85.6	78.8	85.0	89.6

Total average compliance=83.8%.

Table 2 Predictors of smoking behaviour at public places in Punjab, India

	No smoking (n=6730) n (%)	Smoking (n=145) n (%)	Significance (p value)
Signage display			
No	1173 (96.9)	38 (3.1)	0.06
Yes	5557 (98.1)	107 (1.9)	
Signage display at main entrance and other conspicuous places			
No	1469 (96.5)	53 (3.5)	0.00
Yes	5261 (98.3)	92 (1.7)	
Signage complies with the law (in contents, design, language)			
No	1801 (96.6)	64 (3.4)	0.00
Yes	4929 (98.4)	81 (1.6)	
Name/phone number of the reporting officer mentioned on signage			
No	3616 (97.0)	110 (3.0)	0.00
Yes	3114 (98.9)	35 (1.1)	
Presence of smell or ashes			
No	6597 (98.6)	92 (1.4)	0.00
Yes	133 (71.5)	53 (28.5)	
Presence of cigarettes butts/bidi ends			
No	6114 (99.1)	58 (0.9)	0.00
Yes	616 (87.6)	87 (12.4)	
Presence of smoking aids (ashtrays, matchboxes and lighters)			
No	6424 (98.4)	102 (1.6)	0.00
Yes	306 (87.7)	43 (12.3)	
Owners smoking outside the entrance/exit			
No	6699 (98.2)	120 (1.8)	0.00
Yes	31 (55.4)	25 (44.6)	
Type of public place			
Healthcare facilities	1181 (98.7)	15 (1.3)	0.00
Educational institutions	2045 (98.6)	29 (1.4)	
Transit stations	792 (94.7)	44 (5.3)	
Government buildings/offices	1681 (97.9)	36 (2.1)	
Restaurants and bars, shopping malls	1031 (98)	21 (2)	

of India. In previous studies wherein compliance monitoring to smoke-free law in four jurisdictions of India—Sikkim state, Vilupuram district and Coimbatore city in Tamil Nadu and Shimla city in Himachal Pradesh—was assessed using a similar study tool reported compliance rates varying from 82% to 100%.³ Another study by Kumar *et al*, wherein compliance surveys in 38 jurisdictions across India were recorded, reported that 51% of the sites demonstrated full compliance with smoke-free law.⁴

In our study, active smoking was found in just 2% of the sampled public places. A previous study by Goel *et al* in one of the districts of the state of Punjab in the year 2010 had observed that people at 6% of the public places were found actively smoking.⁹ It shows that the compliance to smoke-free law in relation to active smoking had improved over a period of 5 years. The successful implementation can be attributed to multiple factors like strong enforcement of smoke-free law in the state, establishment of state-level and district-level tobacco cells and involvement of multiple stakeholders. Jain *et al*, in a study in western India (Rajasthan), found active smoking in 6% of the studied sites, whereas Kumar *et al*, in his study in the northern hilly state of India (Himachal Pradesh), reported actively smoking in 16% of the sites.^{2, 5} Kaur *et al* studied educational institutes and restaurants of a city of southern India (Chennai) and found that that active smoking was evident at 15% of the sites.⁶

The findings of the present study depict that transit sites like bus stops had very high violations to nearly all indicators

of the legislation. This is not surprising and has been reported in various studies. Kumar *et al* reported in their previous study that educational institutions and healthcare facilities performed well, while restaurants and transit points performed poorly.⁵ In the previous study done by Goel *et al* in the district of Punjab in 2010, a similar finding of poor compliance to smoke-free law in transit sites was reported.⁹ This shows that with time even though overall compliance indicators have improved at the state level, discrepancies exist among the different types of public places. This suggests that the policymakers and implementers need to focus on implementation of legislation at transit sites where the majority of people are exposed to secondhand smoke.

The results also showed that there was a lesser odds of active smoking at public places where the owner of the public place had displayed 'no smoking' signage with the name of the reporting officer. This may be due to the fact that such signages may be more noticed by people and perceived idea of being caught and fined increases the likelihood of compliance. Bonfill *et al* in Spain reported that the presence of appropriate signages prohibiting smoking is associated with a much higher likelihood of compliance with smoke-free law.²¹ Similarly, Apsley *et al* in Scotland had observed the deterrent effect of smoke-free legislation including display of signages on the reduction of secondhand smoke levels.²² However, Vardavas *et al* in Greece observed that signage was not a strong determinant of smoking behaviour.²³ An interesting finding in the present study is that public places where owners smoked

Table 3 Logistic regression of factors affecting active smoking in different public places in Punjab

	Restaurants and bars, shopping malls	Educational institutions	Transit stations	Government buildings	Healthcare facilities	Overall public places
Signage display						
No	1.9 (0.1–25.9)	3.6 (0.7–17.9)	3.1 (0.7–13.1)	5.6 (1.6–19.3)*	0.7 (0.1–7.6)	1.9 (1–3.7)
Yes	R	R	R	R	R	R
Signage display at main entrance and other conspicuous places						
No	0.4 (0.0–4.0)	0.8 (0.2–3.3)	0.2 (0.1–0.7)	0.4 (0.1–1.5)	2.1 (0.2–20.4)	0.9 (0.5–1.7)
Yes	R	R	R	R	R	R
Signage complies with the law (in contents, design, language)						
No	1.2 (0.1–11.6)	1.6 (0.6–3.8)	1.9 (0.4–8.0)	0.3 (0.1–1.0)	0.5 (0.1–3.4)	0.6 (0.3–1.0)
Yes	R	R	R	R	R	R
Name/phone number of the reporting officer mentioned on signage						
No	1.5 (0.4–6.0)	5.0 (0.8–29.9)	0.3 (0.1–1.0)	1.4 (0.6–3.2)	0.9 (0.2–3.5)	0.6 (0.4–0.9)*
Yes	R	R	R	R	R	R
Presence of smell or ashes						
Yes	1.0 (0.1–15.8)	3.2 (0.8–13.4)	8.5 (2.7–26.7)*	15.8 (6.0–41.4)*	13.1 (2.6–65.3)*	7.2 (4.3–12.0)*
No	R	R	R	R	R	R
Presence of cigarettes butts/bidi ends						
Yes	0.3 (0.0–4.7)	0.3 (0.0–4.8)	2.4 (0.8–7.1)	2.3 (0.8–6.3)	2.9 (0.6–15.3)	4.6 (2.7–7.6)*
No	R	R	R	R	R	R
Presence of smoking aids (ashtrays, matchboxes and lighters)						
Yes	2.0 (0.1–29.5)	0.3 (0.0–4.8)	0.6 (0.2–2.0)	2.1 (0.7–6.7)	2.7 (0.3–22.1)	1.5 (0.9–2.5)
No	R	R	R	R	R	R
Owners smoking outside the entrance/exit						
Yes	880.0 (66.4–11660)*	347.1 (80.1–1505)*	13.8 (2.7–71.3)*	17.7 (3.6–86.4)*	44.1 (2.0–958.1)*	5.2 (2.5–11.1)*
No	R	R	R	R	R	R
Type of public place						
Healthcare facilities						R
Educational institutions						1.3 (0.7–2.5)
Transit stations						2.3 (1.3–4.2)
Government buildings/offices						1.5 (0.8–2.7)
Restaurants and bars, shopping malls						1.1 (0.5–2.2)

*Significant at $p < 0.05$.

R, reference.

cigarettes/bidis higher smoking behaviour was observed. This can be attributed to either lack of knowledge of the smoke-free law or problem of their tobacco addiction. Besides this, other variables like 'signage display', 'signage display at main entrance and other conspicuous places', 'signage complaint with the law' and 'presence of smoking aids (ashtrays, matchboxes and lighters)' did not predict 'active smoking' behaviour. In literature, no evidence was found to support the association between these indirect indicators and active smoking. Further studies are needed to advance our understanding of these indirect predictors of active smoking in public places.

Strengths and limitations

The strength of this study is its large sample size and representativeness across different populations of Punjab. A large sample size increases the power to detect differences between different types of public places and thus increases the credibility of our results. The studied places were randomly chosen, thus diminishing selection bias.

This study is however limited by its cross-sectional design due to which it cannot be established that the posting of signages leads to the observed rates of smoking in a particular location, and future prospective cohort studies should be undertaken to explore this aspect. Despite this limitation, this study appears to be the first published attempt from India by providing observational evidence of relating the indirect compliance indicators (like 'signage display') with 'active smoking' seen in public places. Second, the study has been conducted in a selected state of north India, so generalisability of our results across the country is limited. Third, the association between display of 'no smoking' signages and active smoking behaviour at public places needs to be interpreted with caution. The association would depend on how long have the signages being placed at public places. The relation of longevity of display of signages and active smoking behaviour can be explored in future surveys. Fourth, we have used a methodology wherein

an investigator visited public places and using standard checklist captured the compliance. Though recording air nicotine levels in public places would have been a better method to record compliance, it may not be possible for a low–middle-income country like India with resource constraints. Lastly, the study had the limitation of not being able to include data on availability of tobacco in the public place. It is expected that transit sites like bus stops have more availability of shops selling tobacco products compared with other public places like health institutions, which may act as a confounder in the current study. However, due to time constraints this variable could not be included in the study, which however can be explored in future research.

Conclusion and recommendation

This large study found that >80% of the public places in a jurisdiction in north India were compliant with the smoke-free legislation of India. The highest overall compliance was observed in healthcare facilities and least in transit sites. 'No smoking' signages with clearly written name of reporting officer have an effect on curbing smoking behaviours at public places.

It is recommended that policymakers of the state of Punjab should focus more on implementing the smoke-free law at transit sites. 'No smoking' signages should be displayed as per legislation across all public places. Finally, it is suggested that structured training sessions should be organised for owners of workplaces which will help in increasing the compliance of public places to smoke-free legislation.

Contributors SG conceptualised the study, implemented and supervised the field work. SG and DS were involved in data analysis and report writing. RK and VM provided guidance in designing and executing the field work.

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Competing interests None declared.

Ethics approval The State Tobacco Control Cell, Punjab, and Institute Ethics Committee of PGIMER, Chandigarh.

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What this paper adds

- ▶ Policies to reverse the tobacco epidemic in India exist but lack proper implementation and monitoring. Existing studies have reported compliance to smoke-free law by either using a single indicator (observing people actively smoking in public places) or have conducted survey in selected public sites (either educational, healthcare facility).
- ▶ There is a dearth of studies exploring compliance to smoke-free law using a standardised study tool across all public places. No studies to date have explored the association between proxy indicators of smoking (display of 'no smoking' signage, smoking behaviour of incharge of public place) with active smoking by people present at public places.
- ▶ In the present study, we report compliance of smoke-free law using a comprehensive structured observational checklist. The study has been done across all types of public sites including restaurants and bars, shopping malls, government buildings, educational institutions, healthcare facilities and transit sites.
- ▶ The significant positive predictors of 'active smoking' were sites where owner of public place smoked, presence of smell/ash and presence of cigarette butts. No smoking signage mentioning the name of reporting officer had a positive effect on curbing smoking in public places. Thus, there was an association between proxy indicators of smoking with active smoking by people present at public places.

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