Impact of Ban on Smokeless Tobacco (SLT) on Second Hand Smoke (SHS) Exposure among Males : Findings of a Community-based Survey in Delhi

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Abstract :

Introduction: Ban on gutka/smokeless tobacco (SLT) in India beginning in 2011 raised apprehension of its users switching to smoking and thereby increased second-hand smoke (SHS) exposure to non-users. Delhi Government issued notification banning gutka and pan-masala containing tobacco and/or nicotine in 2012. To address circumvention of ban by SLT manufacturers, ban was revised and reissued in 2015 to explicitly ban all SLT products. **Objectives:** To assess change in second hand smoke (SHS) exposure in Delhi three years after gutka ban and one year after explicit ban on all SLT products. **Method:** Cross-sectional household survey was conducted in Delhi during March-December 2016 to assess SHS exposure at home, workplace and public places. Males aged 15 years and above living in urban Delhi were asked questions similar to Global Adult Tobacco Survey (GATS)-India, 2010. Survey data were compared with 2010 records to assess change in SHS exposure between 2010 and 2016. **Results:** As compared to 2010, 12.0% less non-smokers reported SHS exposure at home. Among those working outside home, 13.7% non-smokers reported SHS exposure at indoor workplace as compared to 19.3% in 2010. Less educated people are more likely to face SHS exposure at work. Chance of exposure at any public place during last one month has also decreased by 6.5%. **Conclusion :** Probability of coming across SHS exposure has decreased in urban Delhi at all places in 2016 as compared to 2010. Efforts to enforce SLT ban must sustain without fear of increase in SHS exposure.

Key words: Gutka Ban, Second-Hand Smoke Exposure, Smokeless Tobacco Ban

Introduction:

Ban on gutka/smokeless tobacco (SLT) in India beginning in 2011 raised apprehension of its users switching to smoking and thereby increased second-hand smoke (SHS) exposure to non-users. The apprehension was raised by both sides: SLT industry as well as tobacco control experts and activists, though with different objectives. [1-7]

SLT manufacturers and their raw material suppliers described government's ban on SLT as unfair arguing that smoking products were not banned and SLT users will switch to smoking which unlike SLT use, is harmful for nonsmokers around. [1-4] Large advertisements were placed by them in leading national and vernacular newspapers raising this fear and demanding ban to be withdrawn. [1,4]

Some tobacco control experts and activists also, though supporting the ban, apprehended that selective tobacco ban on SLT alone, will lead to switching to smoking. [5-7] Some experts even shared their personal experience or small research in the community supporting the apprehension, especially increased bidi smoking. [5,8] They advocated for extending scope of SLT ban to include smoking products as well. [5]

Some business analysts also predicted that gutka/SLT ban will benefit the cigarette industry. Their anticipation was of benefit especially to low end brands whose cigarettes can best match the banned cheap SLT products in price. [9] SHS is known to cause coronary heart disease and lung cancer in adults and premature death and disease in

children.[10-13] And, there is no risk-free level of exposure to SHS.[13] Hence, article 8 of WHO-Framework Convention on Tobacco Control (FCTC) and 'P' policy of WHO's MPOWER package have mandated measures for 'protection' from SHS in indoor workplaces, public transport, indoor public places and, as appropriate, other public places.[14,15]

Government of Delhi had issued first ban notification on 11 September 2012 which prohibited 'gutka and pan-masala containing tobacco and/or nicotine'. [16] When gutka manufacturers circumvented ban by replacing gutka with twin-pack (pan masala and chewing tobacco sold separately to be mixed by user to create gutka), the government revised and reissued notification on 25 March 2015 which explicitly bans all SLT products including the twin-pack.[17]

The objective of this study, conducted in 2016 after three years of ban on gutka/pan-masala with tobacco and after one year of unambiguous bans on all SLT products, is to assess if SLT exposure increased in the community during this period as was apprehended by SLT industry and some tobacco control experts.

Method:

Cross-sectional household survey was conducted using a standardized questionnaire in urban area of Delhi during March-December 2016. Males aged 15 and above randomly chosen, one from each household selected through a three-step randomization process in urban Delhi, were included in the survey. For eligibility for the survey, the person must be living in his primary residence prior to survey date and agree to participate. In case of respondents below 18 years, prior consent of the parent or guardian of the minor was also needed. To be eligible, the respondent must also be non-institutionalized i.e. not living in collective living spaces like students' dormitories, hospitals, hotels, prisons, military barracks.

Households were selected through three-stage sampling process. City wards were the primary sampling units (PSUs) and census enumeration blocks (CEBs) were the secondary sampling units (SSUs) selected through probability proportional to size (PPS) sampling. Households formed the tertiary sampling units (TSUs) selected through random walk method.

Questionnaire administered to respondents sought information on their current exposure to SHS. The respondent told about his exposure at home and in last 30 days at indoor workplace, if he worked outside home. He also informed about his exposure at government buildings/government offices, health care facilities, restaurant, public transportation, if he visited any of these public places during last 30 days. The questions asked in this survey and sampling methodology were similar to the Government of India's Global Adult Tobacco Survey (GATS) conducted during 2009-2010 to allow comparability of data. Current exposure to SHS as per our survey is compared with SHS exposure as recorded in the same population during 2009-2010 GATS survey.

Table 1: Change in SHS exposure to adult males at home and at indoor workplace in urban Delhi since 2010

Smoking Status	Year 2010*		Year 2016**		% change	Chi Square	P Value
	N	SHS exposure	N	SHS exposure			
SHS exposure at home							
Non-smoker	572	55.30%	1218	43.30%	-12.0	22.69	<0.05
Overall	851	65.80%	1612	58.10%	-7.7	13.77	<0.05
SHS exposure at indoor workplace							
Non-smoker	351	19.3%	926	13.7%	-5.6%	6.29	<0.05
Overall	530	25.9%	1224	21.8%	-4.1%	3.39	> 0.05

* GATS, 2010; ** Present study

Table 2: SHS exposure among adult males who work indoors by educational background

Educational Background	N	Worked indoors outside of home	Exposed to SHS at indoor workplace
No formal schooling	189	127	47 (37.0%)
Less than primary school	129	80	29 (36.3%)
Primary up to Senior secondary level	940	705	144 (20.4%)
College and above	352	310	47 (15.2%)
Missing/Didn't tell	2	2	0 (0.0%)
All respondents	1612	1224	267 (21.8%)

Table 3: Change in SHS exposure to adult males at public places in urban Delhi since 2010

Public Place	Year 2010*		Year 2016**		% change	Chi Square	P value
	N (visited place)	SHS exposure	N (visited place)	SHS exposure			
Govt. building or govt. office	380	33.4%	953	24.2%	-9.2	11.65	<0.05
Health care facility	287	37.0%	524	31.9%	-5.1	2.12	> 0.05
Restaurants	462	57.1%	708	33.7%	-23.4	62.86	<0.05
Public transport	682	34.2%	1146	24.3%	-9.9	20.54	<0.05
Any public place	777	48.7%	1417	42.2%	-6.5	8.44	<0.05

* GATS, 2010; ** Present study

Chi-square was used to test the statistical significance of the difference observed. SPSS was used for data management and analysis.

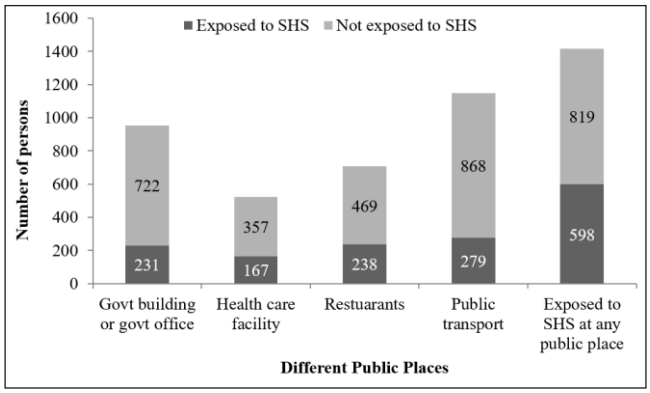
Study protocol was approved by the Institutional Research Committee and participants were interviewed after they gave a written, signed and informed consent.

Results:

Out of 1710 households visited, 1628 households had an eligible member agreeing to participate and 1612 completed the interviews. Survey data shows that 58.1% (95% CI: 55.7% - 60.5%) males aged 15 and above in urban Delhi get exposed to second-hand smoke at home. As compared to 2010, there is 12.0% drop in SHS exposure to non-smokers at home and it is statistically significant (Table 1).

75.9% adult males in our survey worked indoors or 'both indoors and outdoors' outside of home.

Figure 1: Exposure to SHS at public places among adult males visiting that public place in 2016



13.7% non-smoker respondents among them got exposed to SHS at the workplace during last 30 days. SHS exposure at workplace has decreased by 5.6% among non-smokers since 2010 and the decrease observed is statistically significant (Table 1). Less educated people are much more likely to be employed/work at such places where indoor

smoking, and hence SHS exposure, happens (Chi square = 35.76, df = 3, p<0.01) (Table 2).

59.1%, 32.5%, 43.9%, 71.1% respondents in our survey told that they had visited a government building/office, a healthcare facility, a restaurant or travelled in a public transport in last 30 days respectively. SHS exposure among those who visited these places is shown in figure 1.

87.9% respondents visited at least one of these public places. Among them, 42.2% (95% CI: 39.6% - 44.8%) got exposed to SHS at one or more sites. Table 3 shows the change in SHS exposure encountered at these public places in 2016 as compared to 2009-2010. Overall, risk of coming across SHS exposure at any public place in last 30 days has decreased by 6.5% during these years which is statistically significant.

Discussion:

Data in our survey show that since 2010, SHS exposure has decreased across the board, at home, at indoor workplace and at all public places. The decrease observed in probability of being exposed to SHS is statistically significant in most cases.

The decrease observed is in line with decrease in prevalence with smoking as detected in nationwide round-2 of GATS during 2016-2017. Prevalence of Smoking in Delhi has decreased from 17.4% in 2009-2010 (GATS-1) to 11.3% in 2016-2017(GATS-2), a relative decrease of 35.0%. [18,19] In addition, awareness on adverse health effects of tobacco smoke and changing social norms leading to more and more non-smokers unaccepting to someone smoking in their vicinity, thereby de-normalizing public smoking, might have played a role in decrease in SHS exposure rates. However, 'whether this is true' will need to be tested through separate behavioural study. Also, although there is net decrease in smoking prevalence between GATS-1 and GATS-2, it will be interesting to see in future research papers, if there was increase in smoking due to some gutka/SLT users initiating it due to ban. Establishing cause-effect relationship to link 'drop in SHS exposure' with any cause is beyond the scope of this research paper. However, it has provided data-based evidence that net outcome of all tobacco control interventions during these years is that there is significant decrease in SHS exposure, rather than increase which was apprehended when gutka/SLT ban policy was being put in place.

Many research papers have highlighted gaps in enforcement of Gutka /SLT ban. [20-23] Based on our findings, we can strongly recommend to take all measures and ensure strong enforcement of ban on all SLT products, while continuing with other tobacco control interventions in place, without any concern of increase in SHS exposure to non-users.

A limitation we have in our study design is that data are not available on level of SHS exposure in 2012 when ban was first imposed. Due to this, we had to use 2010 exposure levels as pre-ban exposure level. Any change is SHS exposure that was already there since 2010 through 2012 cannot be discounted from our findings. Another limitation is that study is representative of change in SHS exposure only among males living in urban Delhi.

Our findings also highlight need of more stringent workplace norms and their strict enforcement. 21.8% males get exposed at indoor workplace, where they don't have a choice, workplace being a matter of livelihood. Also, data show that the need is particularly high in jobs engaging people with low education. Another, surprising and concerning finding is that least drop in SHS exposure has been recorded at health care facilities and they still have second highest SHS exposure among public places in 2016. It is expected that health care facilities come forward and play a pro-active role in tobacco control.

Conclusion:

After three years of ban on 'gutka and pan-masala containing tobacco and/or nicotine' and after one year of explicit ban on all SLT products, probability of coming across SHS exposure has significantly decreased in urban Delhi. This nullifies the apprehension of increase in SHS exposure harming non-users as a side-effect of gutka/SLT ban. Efforts to enforce SLT ban must sustain without any fear of increase in SHS exposure.

Declaration:

Funding: Nil

Conflict of Interest: Nil

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