Original Research Article

Second-hand smoke exposure prevalence among smokers versus non-smokers and relative change at sub-national level in India: a secondary analysis from Global Adult Tobacco Survey 1 and 2

Sakshi Supehia[1], Shivam Kapoor[2]*, Pranay Lal[2], Rana J. Singh[2], Anushikha Dhankhar[3]

[1]Department of Community Medicine, Dr Rajendra Prasad Government Medical College, Himachal Pradesh, India
[2]International Union Against Tuberculosis and Lung Disease (The Union) South-East Asia Office, New Delhi, India
[3]Employees' State Insurance Corporation Model Hospital, Mumbai, Maharashtra, India

ABSTRACT

Background: Exposure to second-hand smoke (SHS) has been linked to the expanded risk of ill-effects on health every year. This study compared prevalence rates of SHS exposure between smokers and non-smokers within three different settings and states/union territories (UT) in India, during the period 2009-10 and 2016-17.
Methods: The data from two rounds of nationally representative cross-sectional Global Adult Tobacco Survey (GATS) conducted in 2009-10 and 2016-17 were used. Further, the sociodemographic variables associated with exposure to SHS at different settings were analysed using multiple logistic regression analysis. All statistical inferences were based on a significance level of p<0.05.
Results: Although there was a significant decrease in overall prevalence of SHS exposure among smokers and non-smokers at home, government offices, restaurants and, public transportation and slight decrease in health care facility (p<0.05); increased level of exposure was observed at workplace which was not statistically significant (p>0.05). The prevalence of exposure to SHS varied significantly between smokers and non-smokers and differed greatly among states/UT as assessed by the relative change between GATS-1 and GATS-2. While Maharashtra, Andhra Pradesh and, Odisha were among the best-performing states; Jammu and Kashmir, Chhattisgarh and, Madhya Pradesh were the worst-performers.
Conclusions: The results confirmed that the prevalence rates of SHS exposure among non-smokers, were much higher as compared to smokers in all different settings along with state-wise disparities. This calls for the Policymakers for targeted effective enforcement of tobacco control laws, leading to a reduction in the consequences of SHS exposure.

Keywords: Exposure, Global Adult Tobacco Survey, India, Second-hand smoke, Tobacco Control, Prevalence

INTRODUCTION

Tobacco smoking is the leading preventable cause of death among adults. Around 80% of the estimated 1.1 billion smokers reside in low and middle-income countries.[1] The tobacco epidemic accounts for 8 million deaths annually in which more than 7 million deaths are due to direct tobacco use including smoking and smokeless tobacco, while 1.2 million deaths among non-smokers, attributable to Second-hand Smoke (SHS).[1] The phenomenon of Second-hand smoking causes harm to children and adults mostly getting exposed to households and workplaces. "Exposure to SHS is a major public health challenge that remains neglected", since tobacco

smoking affects active smokers as well as those in the vicinity of a smoker. According to WHO, there is no level of SHS exposure which is considered to be safe.[1,2]

In October 2008, the Ministry of Health and Family Welfare, Government of India (MoHFW, GoI) notified the smoke-free rules thereby warranting that all public places in India should be made smoke-free. Since then, state governments and civil society have worked towards advancing smoke-free public places.[3]

According to WHO, around 40% children, 33% male and 35% female non-smokers, were exposed to SHS worldwide in 2004.[4] More than 1.2 million annual premature deaths and around 165,000 children deaths occur due to second-hand smoking more commonly due to respiratory illness during the first few years of life.[5] The Global Youth Tobacco Survey in India (GYTS), conducted in 2009 among youth aged 13-15 years estimated that the prevalence of SHS exposure at home was 21.9% in total and 24.1% and 18.8% among men and women.[6]

The Government of India enacted the COTPA (Cigarette and Other Tobacco Products Act, 2003), wherein Section 4 of COTPA protects non-smokers from SHS exposure.[7] Global Adult Tobacco Survey (GATS)-India, the first large scale survey conducted twice GATS-1 (2009-10) and GATS-2 (2016-17), is designed to collect information on determinants of tobacco use and exposure.[8,9] This is the only survey report in India, which includes detailed section on SHS exposure in three different settings. Although, the GATS-2 survey report compares overall versus non-smokers and fails to draw comparisons between smokers versus non-smokers. Also, limited information is available for relative change at subnational level in India and to our knowledge, no one has analysed it in past.[10-12] As, the recent evidence has focused primarily on non-smokers, the exposure rates among smokers that forms significant proportion of Indian population have not been conferred.[11] Therefore, a null hypothesis was proposed stating that there is no difference in prevalence rates of SHS exposure among smokers and non-smokers, aged >15 years at home, indoor areas of workplace and public places in India. This study also aimed to assess the magnitude of relative change in the prevalence of SHS among States and Union Territories (UT) at the three settings.
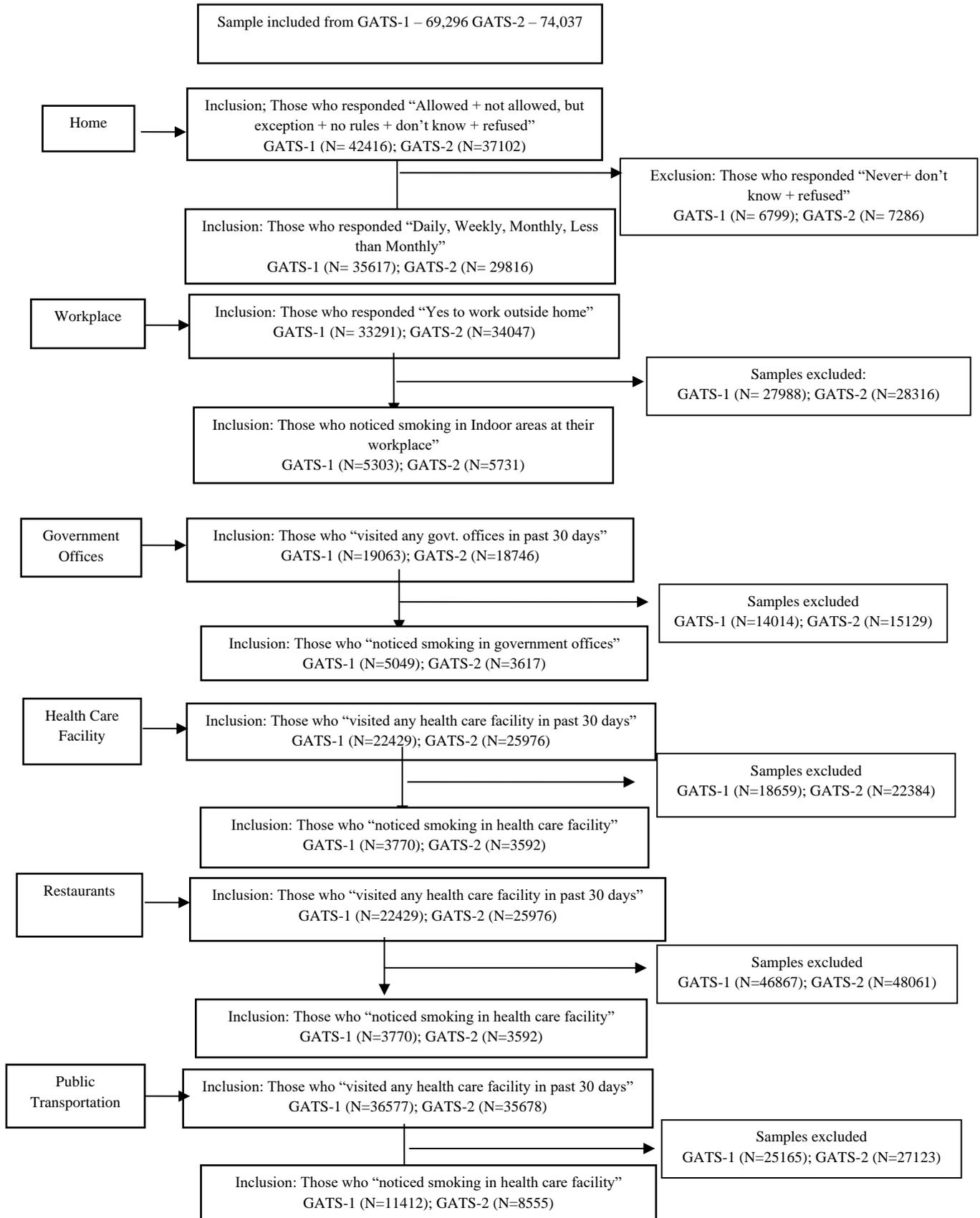
METHODS

A secondary data analysis was carried out to compare the prevalence of SHS exposure at three different settings in India through the GATS-1 and GATS-2 survey. Data was extracted for GATS-1 and 2, India, which is available for public use from the Global Tobacco Surveillance System.[13] This survey data was designed by the Centres

for Disease Control and Prevention (CDC), Johns Hopkins Bloomberg School of Public Health (JHSPH) and Research Triangle Institute International. It was released by International Institute for Population Sciences (IIPS), designated by the MoHFW, GoI. While GATS India survey was conducted among 69,296 individuals in GATS-1 (2009-10), GATS-2 (2016-17) surveyed 74,037 individuals, aged 15 years and above.[8,9]

The estimation of individuals exposed to SHS at home, indoor areas of workplace and public places, GATS-1 and GATS-2 is illustrated in Figure 1. The study groups were classified as "smokers" and "non-smokers" based on the question, "Do you currently smoke tobacco?" Those who responded "daily" and "less than daily" were considered as smokers, whereas non-smokers were categorized as those responding "not at all". The change in prevalence of SHS exposure among smokers and non-smokers over seven years in India, at home, workplace (indoors) and public places (Government offices or buildings, health care facilities, restaurants and public transport) were the main variables considered for the analysis in the study.

The sociodemographic characteristics included in this study were age, gender, residence (urban/rural), educational status (low level includes those with no formal schooling till primary school completed, medium level includes those with less than secondary school to higher secondary school completed and high level includes those with college and post-graduate degree completed) and different regions/states of India.

The analysis was done for two months by a team of four investigators and the disaggregated dataset was analysed using SPSS Version 21.0. (IBM SPSS Statistics for Windows, Version 21.0; IBM Corp., Armonk, NY, USA). For tabulation of the data, Microsoft Excel (version 2007) was used. The McNemar test was used to compare prevalence over two different periods (GATS-1 and GATS-2) and chi-square test was used to analyse the association between smokers and non-smokers with multiple correlates. Non-smokers were further sub-analysed for sociodemographic variables such as age, gender, residence, educational status and region. A binary logistic regression analysis (unadjusted) was conducted to estimate the association between the predictor variables and SHS exposure. Thereafter, multivariate logistic regression analysis (adjusted) was also done to calculate the odds ratio at 95% confidence intervals (CI) for the independent risk factors (Table 3). Further, state/UT wise relative significant change in prevalence for SHS exposure was also assessed. Among 31 states/UTs, those showing relative decrease and increase in all the three observed settings were classified as "best performing" and "worst performing" states, respectively. All statistical inferences were based on significance level of p<0.05 (two-sided).

Sample included from GATS-1 – 69,296 GATS-2 – 74,037

Home → Inclusion; Those who responded "Allowed + not allowed, but exception + no rules + don't know + refused"
GATS-1 (N= 42416); GATS-2 (N=37102)

Exclusion: Those who responded "Never+ don't know + refused"
GATS-1 (N= 6799); GATS-2 (N= 7286)

Inclusion: Those who responded "Daily, Weekly, Monthly, Less than Monthly"
GATS-1 (N= 35617); GATS-2 (N= 29816)

Workplace → Inclusion: Those who responded "Yes to work outside home"
GATS-1 (N= 33291); GATS-2 (N=34047)

Samples excluded:
GATS-1 (N= 27988); GATS-2 (N=28316)

Inclusion: Those who noticed smoking in Indoor areas at their workplace"
GATS-1 (N=5303); GATS-2 (N=5731)

Government Offices → Inclusion: Those who "visited any govt. offices in past 30 days"
GATS-1 (N=19063); GATS-2 (N=18746)

Samples excluded
GATS-1 (N=14014); GATS-2 (N=15129)

Inclusion: Those who "noticed smoking in government offices"
GATS-1 (N=5049); GATS-2 (N=3617)

Health Care Facility → Inclusion: Those who "visited any health care facility in past 30 days"
GATS-1 (N=22429); GATS-2 (N=25976)

Samples excluded
GATS-1 (N=18659); GATS-2 (N=22384)

Inclusion: Those who "noticed smoking in health care facility"
GATS-1 (N=3770); GATS-2 (N=3592)

Restaurants → Inclusion: Those who "visited any health care facility in past 30 days"
GATS-1 (N=22429); GATS-2 (N=25976)

Samples excluded
GATS-1 (N=46867); GATS-2 (N=48061)

Inclusion: Those who "noticed smoking in health care facility"
GATS-1 (N=3770); GATS-2 (N=3592)

Public Transportation → Inclusion: Those who "visited any health care facility in past 30 days"
GATS-1 (N=36577); GATS-2 (N=35678)

Samples excluded
GATS-1 (N=25165); GATS-2 (N=27123)

Inclusion: Those who "noticed smoking in health care facility"
GATS-1 (N=11412); GATS-2 (N=8555)

Figure 1: Sample selection strategy for individuals exposed to SHS at the three settings: home, indoor areas of workplace and public places, GATS-1 and GATS-2, India.

RESULTS

On comparing data of the two rounds of national survey GATS-1 (2009-10) and GATS-2 (2016-17), the overall prevalence rates of SHS exposure among smokers and non-smokers showed significant (p<0.05) reduction at home (52.3% to 38.7%), government offices (26.2% to 21.2%), restaurants (47.8% to 39.3%) and public transportation (33.9% to 27%).
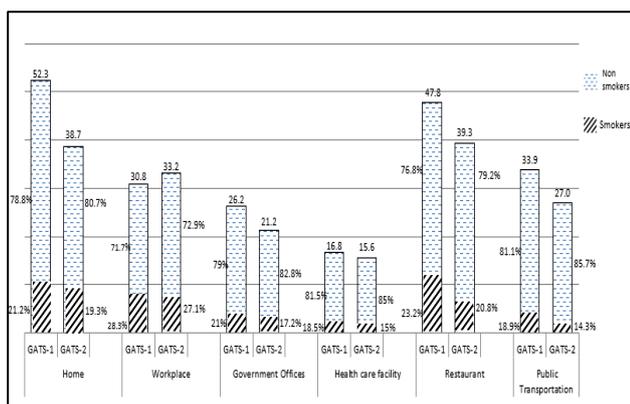
Figure 2: Comparative outcomes for SHS exposure (within past 30 days) among smoker and non-smoker adults in different settings, from GATS-1 and GATS-2, India.

However, the reduction in the overall prevalence rates for health care facility (16.8% to 15.6%) was not found to be significant (p>0.05). On the contrary, there was slight increase (p>0.05) in SHS exposure at workplace (30.8% to 33.2%) (Figure 2).

It is noteworthy that the prevalence of SHS exposure was higher in non-smokers as compared to smokers in all different settings. Tables illustrates the association of SHS exposure with sociodemographic factors among non-smokers at the three settings. The odds for SHS exposure were relatively higher in GATS-2 as compared to GATS-1 among women, urban dwellers, and individuals with a high level of educational status in all the settings. However, the odds were found to be higher among those aged 15-24 years at home, workplace and public transportation (p<0.05).

Among all the regions of India, the SHS exposure at home was found to be more among non-smokers who were living in central parts, during both the surveys. However, the exposure to SHS in the western parts of India, in all the settings was found to be the lowest (p<0.05). On comparing the relative change in the prevalence of SHS (GATS-1 and GATS-2) at three different settings, the worst-performing states were Jammu and Kashmir, Chhattisgarh and Madhya Pradesh with significant increase by ≥100%.

Table 1: Multivariate analysis of variables associated with exposure to SHS at Home and Workplace among non-smokers.

Demographic characteristics	Home		Workplace	
	GATS-1	GATS-2	GATS-1	GATS-2
	(2009-2010)	(2016-2017)	(2009-2010)	(2016-2017)
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Gender**				
Male	0.06 (0.06-0.07)*	0.05 (0.05-0.06)*	0.11(0.09-0.14)*	0.08(0.06- 0.11)*
Age groups (years)**				
15-24	5.04 (4.41-5.75)*	5.47 (4.70 -6.36)*	3.03(2.02-4.55)*	3.19 (2.17-4.69)*
25-44	1.51 (1.36-1.69)*	1.51 (1.35-1.70)*	1.24 (0.86-1.79)	1.36 (0.98-1.89)
45-64	0.89 (0.80-1.00)	0.90 (0.80-1.02)	0.98 (0.68-1.43)	1.02 (0.73-1.43)
Residence**				
Urban	0.96 (0.90-1.02)	1.12 (1.03-1.20)*	1.12 (0.99-1.28)	1.28 (1.12-1.45)*
Education**				
Low level	0.46 (0.41-0.52)*	0.28 (0.24-0.32)*	0.37(0.30-0.45)*	0.30(0.24-0.38)*
Medium level	0.81 (0.72-0.90)*	0.51 (0.44-0.59)*	0.67(0.56-0.81)*	0.52 (0.41-0.65)*
Region wise**				
North	1.00 (0.89-1.12)	0.95 (0.83-1.08)	0.44(0.36-0.54)*	0.45 (0.38-0.54)*
Central	1.34 (1.19-1.51)*	2.05 (1.78-2.36)*	0.91 (0.70-1.19)	0.98 (0.79-1.22)
East	1.52 (1.34-1.71)*	1.81 (1.56-2.10)*	0.58(0.46-0.73)*	0.70 (0.56-0.87)*
North East	0.60 (0.54-0.67)*	0.59 (0.52- 0.68)*	0.35(0.29-0.42)*	0.34 (0.28-0.41)*
West	2.78 (2.42-3.20)*	2.39 (2.00-2.8)*	1.36(1.06-1.74)*	2.75 (1.85-4.08)*

(GATS- Global Adult Tobacco Survey; AOR- Adjusted Odds Ratio; CI- Confidence Interval) *p value < 0.05 **Female, 65+, Rural, High level, South region are taken as references for gender, age group, residence, and region wise respectively while performing logistic regression.

Table 2: Multivariate analysis of variables associated with exposure to SHS at government offices and health care facility among non-smokers.

Demographic characteristics	Government offices		Health care facility	
	GATS 1 (2009-2010)	GATS 2 (2016-2017)	GATS 1 (2009-2010)	GATS 2 (2016-2017)
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Gender**				
Male	0.07 (0.05-0.09)*	0.09 (0.06-0.12)*	0.07 (0.06-0.10)*	0.06 (0.05-0.09)*
Age groups (years)**				
15-24	2.52 (1.66-3.81)*	2.08 (1.32-3.29)*	3.18 (2.01-5.03)*	2.31 (1.42-3.76)*
25-44	0.75 (0.52-1.08)	0.79 (0.55-1.15)	1.21 (0.84-1.73)	1.09 (0.74-1.59)
45-64	0.61 (0.42-0.88)*	0.68 (0.47-0.99)*	0.86 (0.59-1.24)	0.75 (0.51-1.110)
Residence**				
Urban	0.95 (0.81-1.10)	1.45 (1.19-1.76)*	0.94 (0.77-1.13)	1.83 (1.44-2.32)*
Education**				
Low level	0.32 (0.26-0.40)*	0.25 (0.18-0.33)*	0.24 (0.18-0.33)*	0.27 (0.19-0.41)*
Medium level	0.66 (0.55-0.81)*	0.45 (0.34-0.59)*	0.59 (0.43-0.80)*	0.55 (0.38-0.82)*
Region wise**				
North	0.55 (0.43-0.71)	0.47 (0.34-0.66)	0.47 (0.35-0.64)*	0.56 (0.40-0.80)*
Central	0.88 (0.67-1.16)	0.93 (0.66-1.30)	0.76 (0.56-1.05)	0.98 (0.70-1.38)
East	0.50 (0.38-0.66)*	1.41 (0.94-2.12)	0.57 (0.40-0.81)*	1.56 (0.99-2.46)*
North East	0.38 (0.30-0.49)*	0.32 (0.23-0.45)*	0.73 (0.52-1.02)	0.27 (0.17-0.40)*
West	1.90 (1.35-2.69)*	2.47 (1.38-4.43)*	1.47 (0.99-2.17)	3.10 (1.71-5.64)*

(GATS- Global Adult Tobacco Survey; AOR- Adjusted Odds Ratio; CI- Confidence Interval); *p value < 0.05 ;**Female, 65+, Rural, High level, South region are taken as references for gender, age group, residence, and region wise respectively while performing logistic regression.

Table 3: Multivariate analysis of variables associated with exposure to SHS at restaurants and public transportation among non-smokers.

Demographic characteristics	Restaurants		Public Transportation	
	GATS 1 (2009-2010)	GATS 2 (2016-2017)	GATS 1 (2009-2010)	GATS 2 (2016-2017)
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Gender**				
Male	0.06 (0.04-0.07)*	0.13 (0.100-0.18)*	0.06 (0.05-0.07)*	0.07 (0.06-0.09)*
Age groups (years)**				
15-24	3.21 (2.36-4.36)*	1.82 (1.26-2.63)*	2.83 (2.16-3.70)*	3.75 (2.74-5.14)*
25-44	1.27 (0.95-1.68)	0.90 (0.64-1.25)	0.96 (0.76-1.22)	1.44 (1.11-1.87)*
45-64	0.93 (0.69-1.24)	0.74 (0.52-1.04)	0.71 (0.55-0.91)*	1.09 (0.84-1.43)
Residence**				
Urban	0.92 (0.83-1.03)	1.27 (1.09-1.48)*	1.13 (1.01-1.26)*	1.42 (1.22-1.64)*
Education **				
Low level	0.25 (0.21-0.30)*	0.22 (0.18-0.28)*	0.21 (0.18-0.26)*	0.23 (0.17-0.29)*
Medium level	0.54 (0.46-0.64)*	0.46 (0.37-0.58)*	0.54 (0.44-0.65)*	0.53 (0.41-0.68)*
Region wise**				
North	0.55 (0.47-0.64)*	0.42 (0.34-0.52)*	0.45 (0.37-0.55)*	0.47 (0.36-0.61)*
Central	0.97 (0.76-1.22)	0.76 (0.61-0.95)*	0.70 (0.57-0.86)*	0.91 (0.70-1.18)
East	0.75 (0.62-0.89)*	1.24 (0.91-1.69)	0.58 (0.46-0.72)*	1.04 (0.78-1.38)
North East	0.37 (0.31-0.44)*	0.31 (0.25-0.38)*	0.36 (0.29-0.45)*	0.26 (0.19-0.34)*
West	2.36 (1.92-2.90)*	2.39 (1.53-3.73)*	1.51 (1.19-1.92)*	1.92 (1.36-2.72)*

(GATS- Global Adult Tobacco Survey; AOR- Adjusted Odds Ratio; CI- Confidence Interval); *p value < 0.05 ;**Female, 65+, Rural, High level, South region are taken as references for gender, age group, residence, and region wise respectively while performing logistic regression.

In Jammu and Kashmir, while an increase >50% was found at home, health care facility, public transportation, government offices and restaurants, exposure at workplace showed an increase of <25%. Similarly, in Chhattisgarh, there is significant increase by >50% in government offices, health care facility, restaurants, and decrease by >50% in workplace. On the contrary, Assam, Maharashtra and Odisha emerged out as the best performing states (significant decrease >25% among non-smokers).

An interesting finding with significant reduction in SHS exposure (>25%) was observed in all but one setting among the following five states: Tamil Nadu and Tripura (except at Home), Gujarat (except at Government offices), Puducherry (except at restaurants) and Andhra Pradesh (except at workplace). There was a relative increase in the prevalence of SHS exposure at the government offices and restaurants of central India. (p<0.05) (Figure 3).
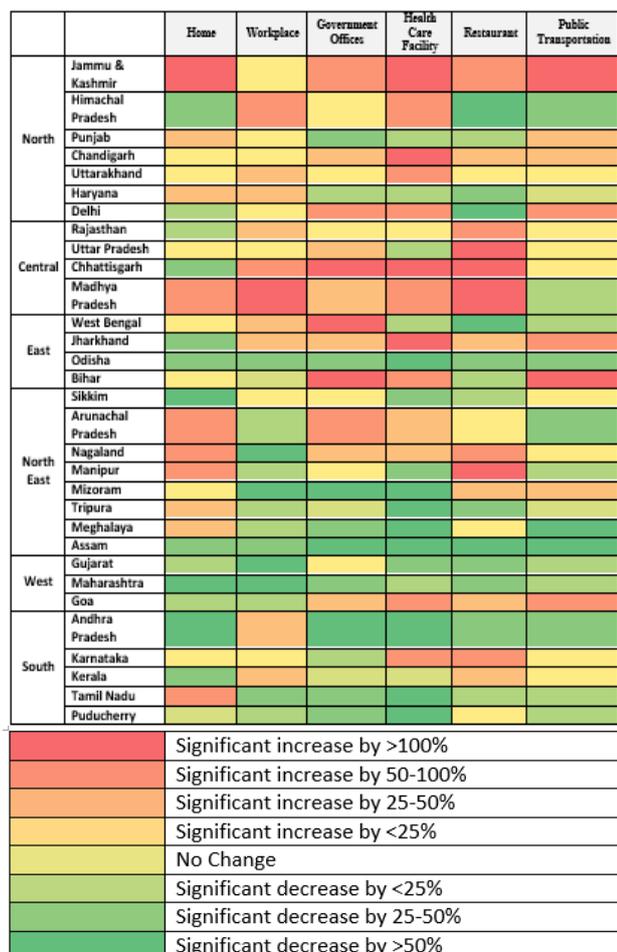
Figure 3: Heat diagram depicting the categorization of Indian states/union territories according to magnitude of relative change (p<0.05) in the prevalence of SHS at home, workplace and public places, between GATS-1 (2009-10) and GATS-2 (2016-17), India.

DISCUSSION

Exposure to SHS which is the leading source of indoor pollution worldwide has been associated with a variety of debilitating diseases such as cancer, heart and respiratory diseases, etc.[14] In response to the ratification made at WHO Framework Convention on Tobacco Control in 2004, India has taken various measures toward reducing tobacco use and its exposure among the non-smokers.[15] Research nowadays is focusing on the health implications of smoking for the non-users (SHS) and this has become a significant adjunct in tobacco control.[12,15-18] The current study analysed and compared the national level data for SHS exposure among smokers and non-smokers Indian adults. The null hypothesis was rejected owing to higher prevalence rates of SHS exposure among non-smokers at home, government offices, restaurant and public transportation.

It was observed that SHS exposure among female non-smokers was relatively higher in every setting which was similar to the previous studies done in India, "International Tobacco Control (ITC) Policy Evaluation survey" conducted in Bangladesh and, "Non-communicable Risk Factor Survey" conducted in Myanmar.[10,19,20] The possible reasons for such high estimates among non-smokers could be attributed to Indian social norms where the majority of women are leading the home front and, poor knowledge about ill-effects of SHS exposure, employment status and lack of voluntary smoking ban at home.[20,21] Hence, there is a need for intensive efforts directed towards women empowerment to increase health awareness and health literacy and, further, the promotion of smoke-free home policies.

In the current study, the prevalence of SHS exposure at home and workplace among non-smokers, aged 15-24 years was relatively higher as compared to the other age groups. These findings are in line with the "Non-communicable Risk Factor Survey conducted in Myanmar" and "National Health and Nutrition Examination Study conducted in Korea" where a younger age cohort (15-24 years) and (19-29 years) respectively was found to have higher odds of exposure.[20,22] This might be attributed to parental smoking at home and an increase in smoking at workplace after the stricter enforcement of smoking ban at public places. There is also a seemingly increasing trend among offices especially corporate offices, reasoned to have a designated smoking area within the buildings.[23]

Our secondary analysis also revealed that the prevalence of SHS exposure among non-smokers had increased in urban areas over the years after the enactment of COTPA. These results were comparable to systematic review and meta-analysis conducted among individuals aged 15 years and older in China.[24] A study in Northern India documented higher likelihood of SHS exposure among

non-smokers belonging to rural neighbourhoods.[16] The reason attributed to the upward trend of SHS exposure among non-smokers in urban areas could be urbanization and those having social interactions leading to job-related migration in such regions.[25] The significant decrease in prevalence among the best performing states could be attributed to NTCP (National Tobacco Control Program) under MoHFW, wherein a multitude of tobacco cessation efforts that have been carried out including toll-free number- "National Tobacco Quitline", "Tobacco Cessation Centre", and sensitization through short messages- "mCessation services".[26] Further, the significant relative reduction in prevalence of SHS exposure (>50%) in Maharashtra could be attributed to other sustained measures functioning within the state such as "TfV (Tobacco-free village)" program supporting financial rewards and non-monetary incentives directed to the trained stakeholders.[27]

The strength of the study is GATS data encompassing the nationwide representative sample that provides a wider picture, robust standardized methodology and generalisability. This is the first-ever attempt of comparing the prevalence of SHS exposure among smokers and non-smokers since the enactment of COTPA, 2003. The findings contribute in several ways, the magnitude of relative change in the prevalence of SHS at sub-national level can serve as a roadmap for the policymakers, and simultaneously lays the foundation for deeper areas of research.

However, there are several limitations to the current study. For secondary data analysis, the results are dependent on the available data set and hence a few missing values might underestimate or exaggerate the study findings. Second, the measure to SHS exposure from the self-reported nature of data collection might not always reflect the real exposure to SHS. Moreover, the way the questions are framed for GATS does not necessarily warranty an individual's exposure to smoke, during the past 30 days, did you "notice anyone smoking" in indoor areas where you work? Or during the past 30 days, did you "notice anyone smoking" at any public place? A scientifically robust approach for SHS exposure would be to measure urinary cotinine excretion of non-smokers and several studies in the past have documented validated questionnaire assessments using cotinine measures.[28,29] This might be further recommended to the policymakers for the third round given the seriousness of this issue. Third, we carried out cross-sectional analyses of the available data from both the rounds of GATS, India; conclusively these associations are outcomes of variables observed at a single point for the past thirty days only and do not reflect exact life-course of an individual to SHS exposures. Hence, these findings should be interpreted with caution. Fourth, we could not carry out further analysis for SHS specific to particular smoke products as GATS does not categorize exposure to the type of smoked product (ex- bidi, cigarette, cigar, chillum etc.). Also, we can only assume that the survey

respondents were aware of the new product like electronic cigarettes/HTPs (Heated Tobacco Products) and did not misinterpret smoke with a vape. Hence, such considerations are necessary while planning the questionnaire for GATS-3 and we recommend this to be kept in mind while interviewing the individuals.

CONCLUSION

Given the existing disparities at the sub-national level, policymakers at the national and state level need to prioritize enforcement of smoke-free rules. Current disputes in exposure at public transportation and government offices suggest that enforcement of smoke-free rules is low and needs strengthening, given those smoke-free efforts emanated in public transport and in government offices. These findings are crucial for strengthening the implementation and adequate enforcement of tobacco related policies and legislations across the country.

REFERENCES

1. World Health Organisation. WHO Tobacco Fact sheets 2019. Available at https://www.who.int/news-room/fact-sheets/detail/tobacco. Accessed on 5 February 2021.
2. Singh RJ, Lal PG. Second-hand smoke: a neglected public health challenge. Indian J Public Health. 2011;55:192-8.
3. Government of India. Ministry of Health and Family Welfare. Revised smoke free rules. notification in the official gazette GSR.417 (E), 2008. Accessed on 5 February 2021.
4. World Health Organisation. WHO Global Health Observatory (GHO) Data. Available at https://www.who.int/gho/phe/secondhand_smoke/exposure_text/en/. Accessed on 5 February 2021.
5. World Health Organisation. WHO Quantifying environmental health impacts. Available at https://www.who.int/quantifying_ehimpacts/publications/shsarticle2010/en/. Accessed on 10 February 2021.
6. World Health Organisation. WHO India ages 13-15 Global Youth Tobacco Survey (GYTS) Fact sheet. Available at https:// www. who. int/

fctc/reporting/Annexoneindia.pdf. Accessed on 12 February 2021.

7. Ministry of Law and Justice. COTPA 2003. Available at https://www. tobaccocontrollaws.org/files/live/India/India-COTPA—national.pdf. Accessed on 10 February 2021.

8. Ministry of Health and Family Welfare; Government of India. Global Adult Tobacco Survey; GATS India- 2009–2010. International Institute for Population Sciences. 2010:1-289. Accessed on 15 February 2021.

9. Ministry of Health and Family Welfare Government of India. Global Adult Tobacco Survey 2016–2017. International Institute for Population Sciences. 2017. Available at https:// mohfw. gov. in/ sites/ default/ files/GlobaltobacoJune 2018. Pdf. Accessed on 10 February 2021.

10. Tripathy JP. Secondhand smoke exposure at home and public places among smokers and non-smokers in India: findings from the global adult tobacco survey 2016-17. Environmen Sci Pollution Res. 2019;12:19-23.

11. Verma M, Kathirvel S, Das M, Aggarwal R, Goel S. Trends and patterns of second-hand smoke exposure amongst the non-smokers in India-A secondary data analysis from the Global Adult Tobacco Survey (GATS) I & II. Plos one. 2020 Jun 10;15(6):e0233861.

12. Reddy MM, Kanungo S, Kar SS. Correlates of secondhand smoke exposure among nonsmoking youth (15-24 years) in India: secondary analysis from global adult tobacco survey, 2009-10. J Family Med Prim Care. 2018;7:111-7.

13. Center of Disease Control. GTSS Data: Datasets. Available at https:// nccd. cdc. gov/ GTSS DataSurveyResources/Ancillary/DataReports.aspx? Country=180&CAID=2&Survey=4&WHORegion= 2&Site=384000. Accessed on 10 February 2021.

14. Law M, Morris J, Wald N. Environmental tobacco smoke exposure and ischaemic heart disease: An evaluation of the evidence. Br Med J. 1997;315:973-80.

15. World Health Organization (WHO). Framework Convention on Tobacco Control, 2004 Available at https://apps.who.int/iris/bitstream/handle/10665/428 11/9241591013.pdf;jsessionid=82BED20274E6F93 DA57B9DF2309B40FC?sequence=1. Accessed 17 February 2021.

16. Bhatt G, Goel S, Mor S, Gupta R. Exposure to Second-hand smoke and its correlates in Northern state of India. Br Med J. 2018;62:128-32.

17. Zheng D, Ji Y, Dong YH. The prevalence of smoking, second-hand smoke exposure, and knowledge of the health hazards of smoking among internal migrants in 12 provinces in China: a cross-sectional analysis. BMC Public Health. 2018;18:655.

18. West R. Tobacco smoking: health impact, prevalence, correlates and interventions. Psychol Health. 2017;32(8):1018-36.

19. Abdullah AS, Driezen P, Sansone G, Nargis N, Hussain GAKM, Quah ACK, et al. Correlates of exposure to secondhand smoke (SHS) at home among non-smoking adults in Bangladesh: findings from the ITC Bangladesh survey. BMC Pulmonary Medicine. 2014;14:117.

20. Sein AA, Than HM, Dhirendra S, Nyo K. Exposure to second-hand tobacco smoke among adults in Myanmar. Indian Journal Cancer. 2012;49:410-8.

21. Agrawal D, Aggarwal A, Goel S. Women exposed to second-hand smoke more at home than at workplace: An analysis of GATS Report, India, 2009-10. J Fam Med Prim Care. 2015;4(3):293.

22. Lee BE, Ha EH. Exposure to environmental tobacco smoke among South Korean adults: a cross-sectional study of the 2005 Korea national health and nutrition examination survey. Environ Health. 2011;10:29.

23. Hakansta C. Workplace smoking. working paper: a review of national and local practical and regulatory measures. Int Labour Organization. 2021;2:32-9.

24. Zeng J, Yang S, Wu L, Wang J, Wang Y, Liu M. Prevalence of passive smoking in the community population aged 15 years and older in China: a systematic review and meta-analysis. BMJ Open. 2016;6(4):e009847.

25. Petersen AB, Thompson LM, Dadi GB. Factors associated with second hand tobacco smoke in the home: an exploratory cross-sectional study among women in Aleta Wondo, Ethiopia. BMC Public Health. 2016;16:910.

26. National Tobacco Control Programme (NTCP). Ministry of Health and Family Welfare. New Delhi; Government of India; 2004. Available at https://mohfw.gov.in/sites/default/files/About%20N TCC.pdf. Accessed on 20 February 2021.

27. Chatterjee N, Patil D, Kadam R, Fernandes G. The Tobacco-Free Village Program: Helping rural areas implement and achieve goals of tobacco control policies in India. Glob Health Sci Pract. 2017;5(3):476-85.

28. US Center for Disease Control and Prevention. About the National Health and Nutrition Examination Survey. Available at https://www.cdc.gov/nchs/nhanes/about_nhanes.htm l. Accessed on 20 February 2021.

29. US Department of Health and Human Services. The Health consequences of involuntary exposure to tobacco smoke: a report of the surgeon general. US Centers for Disease Control and Prevention; 2006. Accessed on 20 February 2021.