

# Women exposed to second-hand smoke more at home than at workplace: An analysis of GATS Report, India, 2009–10

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### ABSTRACT

**Background:** Tobacco smoke has adverse health effects on women of the reproductive age group with serious health implications for the next generation. **Objectives:** This study assessed the prevalence of current active smoking, second-hand smoke (SHS) exposure and the factors influencing smoke exposure in females of the reproductive age group. **Materials and Methods:** Data from the nationally representative Global Adult Tobacco Survey-India (GATS 2009) was analyzed for socio demographic variables, tobacco-related variables and knowledge variables. **Results:** 50.4% of the women in the reproductive age group had been exposed to SHS at home, though only 2.6% of the women were current active smokers. This was more than the SHS exposure at work (21.7%) and elsewhere (32.6%). SHS exposure of the women at home did not vary significantly with knowledge of adverse effects of smoking but was affected by the place of dwelling as the smoke exposure was found to be more among rural women. **Conclusion:** SHS exposure is more prevalent than current active smoking in women of the reproductive age group and that too at home. Thus, policies need to be framed in order to curb this menace which is a vicious one as women don't really have an alternative as far as this exposure is concerned.

**Keywords:** Knowledge, reproductive age, second-hand smoke, smoking, tobacco

### Introduction

Global evidence suggests that tobacco, in the form of smoking as well as second-hand smoke (SHS), has significant health implications in women of the reproductive age group.<sup>[1,2]</sup> Tobacco kills approximately 6 million people all over the world.<sup>[3]</sup> Inhalation of SHS by non-smokers accounts for another 600,000 of premature deaths.<sup>[4]</sup> SHS is a mixture of the smoke given off by the burning end of tobacco products (side-stream smoke) and the mainstream smoke exhaled by smokers. It is well documented that long-term exposure to SHS leads to lung cancer and coronary heart disease in non-smoking adults.<sup>[3]</sup> Thus, the fatal effects of SHS are comparable with the adverse effects of active smoking.

Many studies have ventured to find out the effect of smoking on the pregnancy outcomes.<sup>[1,3,5]</sup>

Evidence also suggests that SHS exposure in women of a reproductive age can cause adverse reproductive health outcomes similar to active tobacco smoking such as pregnancy complications, fetal growth restriction, preterm delivery, stillbirths, and infant death.<sup>[5]</sup> However, there are dearth of studies which have explored the factors influencing the exposure of women in the reproductive age group to the tobacco smoke inhalation. Few studies have shown that smoking in women has association with lower education, lower socio-economic status as well as the ethnicity.<sup>[6,7]</sup> But no studies in India have been done to assess the factors associated with SHS exposure in the women.

The present study was planned with the objectives to find out the prevalence of current active smoking and SHS exposure in females of the reproductive age group, to find out the factors influencing the habit of current active smoking, and the SHS exposure among women of the reproductive age group.

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These factors have revealed newer facets of tobacco exposure. This could help in formulation of behavioral change strategies as well as improvements needed in the current legislations in order to reverse the tobacco epidemic among the women.

## Material and Methods

For the purpose of the study, we analyzed data from the Global Adult Tobacco Survey-India (GATS 2009) which is available on the internet as GATS India Report 2009–10. This was a cross-sectional survey covering the whole country that was conducted using a nationally representative probability sample to provide estimates of tobacco use and its various dimensions. The survey involved multistage cluster sampling method and covered all non-institutionalized people above 15 years of age.

For this study, the study population was women in the reproductive age group, i.e. from 15 to 49 years. From the GATS India data, we analyzed the various socio-demographic parameters like age, residence (type of residence-rural/urban), education and occupation. Responses of current smoking for these variables were analyzed. For the analysis, ages were classified into three groups: 15–26 years, 27–38 years and 39–49 years. Education was regrouped into three groups: Less than primary, primary to senior secondary and graduate and above. Similarly, occupation was regrouped into: Employed, students and not employed.

Exposure to SHS was assessed separately on three places—home, workplace and elsewhere (restaurants, government building, public transport and health facility). Exposure at home was taken as positive if the respondent's answer for "how often does anyone smoke inside your home" was any of the responses viz. daily, weekly, monthly or less than monthly. This was done because even if the woman has been exposed to tobacco smoke even once in a few months, the health risks remain there. Risk of exposure to tobacco smoke at work place was calculated from among those women who were working outside their home including both indoors and outdoors. SHS exposure elsewhere was taken as positive if the woman had seen people smoking at any of these places to which she had gone in the last 30 days—restaurants, government offices or buildings, health facilities and/or public transport.

For those who were exposed to SHS, apart from socio-demographic factors, knowledge whether SHS inhalation caused health problems was also assessed. The dependent variables were current smokers and exposure to SHS in the last 30 days.

The study was exempted from ethics review by the Chairperson of the Ethics Advisory Group of International Union against Tuberculosis and Lung Disease, Paris, France, as it was a secondary analysis of existing dataset and did not involve any direct interaction with human participants.

The data was then analyzed using SPSS 10 and chi-square test and odd's ratio were calculated to find out the association between the variables.

## Results

More number of women in the reproductive age group belonged to the younger age group (15–38 years; 76.5%), most of them had education less than or up to senior secondary (90.0%) and majority of them were not employed (65.3%). Approximately, 61% of the women resided in rural areas.

The number of women in the reproductive age group who were current smokers was 2.6%. For those women who confirmed that smoking was allowed at their home, more than half (50.4%) had been exposed to SHS at home [Table 1].

Socio-demographic factors like age, education, occupation and residence as well as knowledge regarding adverse effects of smoking on health significantly influenced the rate of current smokers among women of the reproductive age group ( $P < 0.001$ ) [Table 2].

For SHS exposure, age was not found to have a significant association with exposure at home and at work place while it significantly influenced the exposure at other places ( $P < 0.001$ ). Similarly, education of the woman was not found to be significantly related to the exposure to SHS elsewhere, but the relationship was statistically significant for exposure at home and at work place; exposure decreased with higher education ( $P < 0.001$  in both). The other factors like occupation and place of residence were found to be significantly associated with the SHS exposure in women of reproductive age at all places. However, knowledge regarding adverse effects of smoking on health had no effect on the exposure to SHS at home ( $P = 0.90$ ) but was significantly related to SHS exposure at work and elsewhere [Tables 3-5].

## Discussion

The analysis of GATS data for women of the reproductive age has thrown light on certain interesting facts. It reveals that practice of current smoking in the women is influenced by age, education, occupation, place of residence and knowledge of adverse effects of smoking on health. According to a study done by Fronczack *et al.*, in Poland on adults, the number of

**Table 1: Prevalence of exposure by active smoking and second-hand smoking, among women of the reproductive age group in India, GATS 2009-10**

Type of smokers	Total number of women	Number of women who were exposed	Percentage
Current smokers	28,482	743	2.6
Second-hand smoke exposure at home	28,482	14,355	50.4
Second-hand smoke exposure at work place	2780 <sup>a</sup>	604	21.7
Second-hand smoke exposure at other places <sup>b</sup>	17,744 <sup>c</sup>	5780	32.6

<sup>a</sup>Total number of women who worked outside home. <sup>b</sup>Other places include restaurants, government buildings, health facilities and public transport. <sup>c</sup>Total number of women who visited other places

**Table 2: Predictors of current active smokers among women of the reproductive age group in India, GATS 2009-10**

Predictors	Total women	Current smokers	Percentage	P value	OR values (95% CI)
Age group					
15-26	9710	119	1.2	<0.001	Reference
27-38	12,080	305	2.5		0.48 (0.38-0.60)
39-49	6692	319	4.8		0.25 (0.20-0.31)
Education*					
Less than primary	11,404	527	4.6	<0.001	Reference
Primary to senior secondary	14,237	192	1.3		3.54 (2.99-4.20)
Graduate and above	2789	22	0.8		6.09 (3.91-9.6)
Occupation*					
Employed	7087	280	39.5	<0.001	Reference
Students	2733	6	2.2		18.62 (8.02-46.29)
Not employed	18,595	305	1.6		2.45 (2.07-2.9)
Type of residence					
Urban	11,179	146	1.3	<0.001	0.37 (0.31-0.45)
Rural	17,303	597	3.5		
Knowledge of effects of smoking**					
Yes	26,095	606	2.3	<0.001	Reference
No	1024	56	5.4		0.41 (0.31-0.55)
Don't know	1302	73	5.6		0.40 (0.31-0.52)

\*Those who said 'don't know' or refused to answer were not included. \*\*Those who refused to answer or the responses were missing, were not included. OR: Odds ratio; CI: Confidence interval; GATS: Global Adult Tobacco Survey-India

**Table 3: Predictors of second-hand smoke exposure at home, among women of the reproductive age group in India, GATS 2009-10**

Predictors	Total women (N=28482)	Women exposed to SHS at home	Percentage	P value	OR values (95% CI)
Age group					
15-26	9710	4899	50.5		Reference
27-38	12,080	6160	50.9	0.07	0.98 (0.93-1.03)
39-49	6692	3296	49.3		1.05 (0.99-1.12)
Education*					
Less than primary	11,404	6939	60.8		Reference
Primary to senior secondary	14,237	6624	46.5	<0.001	1.79 (1.7-1.88)
Graduate and above	2789	761	27.3		4.14 (3.78-4.54)
Occupation*					
Employed	7087	3624	51.1		Reference
Students	2733	1178	43.1	<0.001	1.38 (1.26-1.51)
Not employed	18,595	9504	51.1		1.00 (0.95-1.06)
Type of residence					
Urban	11,179	4525	40.5	<0.001	Reference
Rural	17,303	9830	56.8		0.52 (0.49-0.54)
Knowledge of effects of smoking*					
Yes	26,095	13,073	50.1	0.90	Reference
No	1024	515	50.3		0.99 (0.87-1.13)

\*Those who said 'don't know' or refused to answer were not included. GATS: Global Adult Tobacco Survey-India; SHS: Second-hand smoke; OR: Odds ratio; CI: Confidence interval

current tobacco smokers was inversely proportional to the level of education, which is in line with our finding.<sup>[8]</sup>

The women were exposed to SHS at home more than anywhere else (50.4% at home as compared to 21.7% at workplace and 32.6% elsewhere). In another study using GATS data for Bangladesh, the extent of SHS in females at various places was found to be similar.<sup>[9]</sup> But in a study done on non-smoking adults in Canada in 2003, SHS exposure was found to be more in public places and in younger adults.<sup>[10]</sup> Similar study in Nigeria revealed that SHS exposure was more in public places and 19.5% of

women had been exposed to SHS in the period of the study.<sup>[11]</sup> In a study done on non-smoking pregnant women in Spain by Aurrekoetxea *et al.*, low educational level was associated with more SHS exposure and SHS exposure was found to be the most at home.<sup>[7]</sup> In a New York city study on non-smoking pregnant women, the authors found a similar relationship between educational level of the woman, her ethnicity and her SHS exposure.<sup>[12]</sup> Our study as well as the study in Spain<sup>[7]</sup> has found that the SHS exposure was maximum at home. This is alarming as we don't have any policy for control of SHS home exposure as of now. Age of the woman, her knowledge about

**Table 4: Predictors of second-hand smoke exposure at work place, among women of the reproductive age group in India, GATS 2009-10**

Predictors	Total women (N=2780)	Women exposed to SHS at work place	Percentage	P value	OR value (95% CI)
Age group					
15-26	830	184	22.2		Reference
27-38	1264	284	22.5	0.37	0.98 (0.79-1.22)
39-49	686	136	19.8		1.15 (0.89-1.49)
Education*					
Less than primary	704	226	32.1		Reference
Primary to senior secondary	1234	285	23.1	<0.001	1.57 (1.27-1.95)
Graduate and above	841	93	11.1		3.80 (2.89-5.01)
Occupation*					
Employed	2218	464	20.9		Reference
Students	188	25	13.3	<0.001	1.72 (1.10-2.73)
Not employed	373	115	30.8		0.59 (0.46-0.76)
Type of residence					
Urban	1347	195	14.5	<0.001	
Rural	1433	409	28.5		0.42 (0.35-0.51)
Knowledge of effects of smoking**					
Yes	2610	552	21.1		Reference
No	72	24	33.3	0.005	0.54 (0.32-0.91)
Don't know	92	28	30.4		0.61 (0.38-0.99)

\*Those who said 'don't know' or refused to answer were not included. \*\*Those who refused to answer or the responses were missing, were not included. GATS: Global Adult Tobacco Survey-India; SHS: Second-hand smoke; OR: Odds ratio; CI: Confidence interval

**Table 5: Predictors of second-hand smoke exposure elsewhere, among women of the reproductive age group in India, 2009-10**

Predictors	Total women (N=17,744)	Women exposed to SHS elsewhere	Percentage	P value	OR value (95% CI)
Age group					
15-26	6221	2160	34.7		Reference
27-38	7529	2446	32.5	<0.001	1.11 (1.03-1.19)
39-49	3994	1174	29.4		1.28 (1.17-1.39)
Education*					
Less than primary	5766	1879	32.6		Reference
Primary to senior secondary	9655	3120	32.3	0.55	1.01 (0.94-1.09)
Graduate and above	2290	767	33.5		0.96 (0.86-1.07)
Occupation*					
Employed	4707	1587	33.7		Reference
Students	2141	819	38.3	<0.001	0.82 (0.74-0.91)
Not employed	10,862	3368	31.0		1.13 (1.05-1.22)
Type of residence					
Urban	7512	2204	29.3	<0.001	
Rural	10,232	3576	34.9		0.77 (0.72-0.82)
Knowledge of effects of smoking**					
Yes	16,629	5432	32.7		Reference
No	506	187	36.9	0.002	0.83 (0.69-1.00)
Don't know	569	153	26.9		1.32 (1.09-1.60)

\*Those who said 'don't know' or refused to answer were not included. \*\*Those who refused to answer or the responses were missing, were not included. SHS: Second-hand smoke; OR: Odds ratio; CI: Confidence interval

the health effects of smoking and status of employment hardly affected her SHS exposure at home. This is due to the fact that for females, there is no replacement for home.

At the work place, the SHS exposure was not found to have any relationship with age of the woman but her level of education affected the SHS exposure at work. The higher the educational qualifications, less was the exposure. Students had a lower risk of SHS exposure at work place, probably since they were not

involved in outdoor work. This exposure was more in rural areas and among those who were not employed with any organization. It may be because in the rural areas, women were working outdoors in the fields with their husbands and thus being exposed to SHS. Significant association was observed between knowledge regarding adverse effects of smoking and the SHS exposure at work. Those who had knowledge about it were less exposed as compared to those who had no knowledge or did not give a definite answer. Moreover, bans on public smoking are more

stringent in urban areas whereas the rural areas, especially the farms and fields don't have a comprehensive monitoring system in this respect.

Exposure to SHS elsewhere was significantly related to all the factors except education. More SHS exposure elsewhere was observed in the younger age groups, students, in rural areas and those who did not have knowledge of adverse effects of smoking on health. Similar results were reflected in a study done in Nigeria where SHS exposure at public places was 19.5% in women.<sup>[11]</sup>

Limitations of Study: The study involves the analysis of GATS 2009–10 data for India. This data has no references to the socio-economic status of the respondents which is an important factor influencing exposure to tobacco smoke.

## Conclusion and Recommendation

From the analysis of the GATS-India, 2009–10, it can be concluded that second-hand smoke exposure is more prevalent than current active smoking in women of the reproductive age group. The SHS exposure is highest at home, in rural areas, in women who have less than senior secondary level of education and in students who visit other places like public building, health facility and restaurants, and used public transport. Thus, policies need to be framed in order to curb this menace which is a vicious one as women don't really have an alternative as far as this exposure is concerned.

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