



Prevalence And Predictors of Exposure to Second-Hand Smoke Among Never-Tobacco Smokers

Deepak Sharma¹, Naveen Krishan Goel²

¹Government Medical College and Hospital, Chandigarh, India

²Government Medical College and Hospital, Chandigarh, India

ABSTRACT

Background: Exposure to Second-hand tobacco smoke (SHS) harms health. It is a risk factor for various diseases like asthma, hypertension, diabetes, heart disease and lung cancer. This study aimed to determine the prevalence and predictors of second-hand tobacco smoke among adult never-smokers.

Methods: A cross-sectional study was conducted among 220 participants aged 18 years and above. A pre-tested questionnaire was used to elicit information regarding exposure to second-hand smoke at the home, workplace and various public places. The data was analysed using the Epi Info software for windows.

Results: The second-hand smoke exposure at home and workplace was 11.4% and 19.1%, respectively. The SHS exposure at bus stops, public transport, government buildings and health care facilities was 33.3%, 13.0%, 7.6% and 3%, respectively. The in-home study participants with a current tobacco smoker, family member and/or friend had comparatively higher exposure to second-hand tobacco smoke. In the workplace and or public places, male study participants and illiterate individuals had higher exposure to second-hand tobacco smoke.

Conclusion: The observed level of SHS exposure among non-smokers is a public health concern. Family members should not allow anyone to smoke in their home environment. The public health law prohibiting tobacco smoking in workplaces and public places needs further strengthening.

Keywords: tobacco, second-hand smoke, home, public place, workplace

INTRODUCTION

The tobacco epidemic is a public health threat of the current century. A significant proportion of morbidity and mortality is attributed to its use. According to the World Health Organization, a whopping 7 million deaths result from direct tobacco use, while around 1.2 million results from non-smokers exposed to second-hand smoke¹. Second Hand Smoke (SHS) is the smoke formed from the burning of tobacco products that the smoker exhales. People inhaling this tobacco smoke put them at risk of developing various diseases like hypertension², heart disease³, diabetes⁵ and even lung carcinoma⁶. Furthermore, exposure to SHS in pregnant women can lead to pregnancy complications and low birth weight⁷. Studies conducted

worldwide have documented a high exposure to SHS among people^{8,9,10}.

The SHS exposure may occur in various settings, including home, workplace or accessible public areas like restaurants, public transport etc. Smoke-free public legislation in India, namely the Cigarettes and Other Tobacco Products Act (COTPA), prohibits people from smoking in public places like restaurants, health care facilities, government offices and public transportation¹¹. Though implemented for a long time, full compliance with this legislation is still a challenge^{12,13}. The Global Adult Tobacco Survey (GATS) 2016-17 of India revealed that as high as 38.7% of the adults were exposed to second-hand smoke at home. The SHS exposure at the workplace,

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Correspondence: Dr. Deepak Sharma (Email: drdeepakgmch@gmail.com)

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government buildings, health care facilities, restaurants and public transport was 30.2%, 5.3%, 5.6%, 7.4% and 13.3% respectively¹⁴.

With this background, this study aimed to determine the prevalence and predictors of second-hand tobacco smoke exposure among adults never tobacco smokers at home, in workplaces and public places. It is expected that the current study findings will be of use to tobacco control policymakers for designing appropriate interventions to control the menace of SHS.

MATERIALS AND METHODS

A community-based cross-sectional study was done among 220 adult never-smokers residing in the rural field practice area of the Department of Community Medicine, Government Medical College and Hospital, Chandigarh. Data collection was done during November and December 2020. Assuming a prevalence of SHS exposure at home to be 14.5%¹⁵, absolute precision of $\pm 5\%$ and a non-response rate of 15%, a sample size of 220 was calculated. Through simple random sampling, households were initially selected, after which the eligible study participants were enrolled. If there was more than one eligible study participant in a selected household, then one of them was selected by simple random sampling.

A "never-tobacco smoker" was defined as one who had never smoked tobacco in their lifetime. The study tool consisted of questions on sociodemographic variables and exposure to SHS in various settings, like home and outside (workplace, public places). The public places included were government buildings, health care facilities, restaurants, bus stops and public transport. The study participants were questioned whether they had been exposed to someone else's tobacco smoke at home in the past 30 days. Similarly, they were asked if they visited and were exposed to SHS at the workplace or public places in the last 30 days preceding the survey. Exposure was defined as inhaling someone else's tobacco smoke while sitting, standing, or walking close in the vicinity of a smoker.

The dependent variables were SHS exposure at home and outside the home. The independent variables studied were age (categorized into three groups 18-35 years, 36-55 years, older than 55 years), education (no formal education or literate), gender, marital status, knowledge of SHS harm and family members or friends who are currently smoke tobacco. A current smoker was defined as one who had smoked tobacco at least once in the past one month. The knowledge that SHS exposure is harmful to health was assessed using a single question: Does inhaling someone else's tobacco smoke cause serious illness in non-smokers? Those who answered in the affirmative were considered to have the correct knowledge. Further, the study participants were asked whether

they had heard about a law prohibiting smoking in public places (COTPA).

Before starting the survey, permission was obtained from the ethics committee of Government Medical College and Hospital. Informed written consent was obtained from the study participants before interviewing them. The data was analyzed using Epi Info software for windows (CDC Atlanta). For testing the association between independent and dependent variables, the chi-square test of significance was used.

RESULT

A total of 220 students participated in the study. The mean age of study participants was 41.6 years (SD=15.6), ranging from 18 to 83 years. Most of them were males (61.8%, 136/220), literates (82.3%, 181/220), married (81.4%, 179/220) and employed in some job (64.1%, 141/220). Around one-third were homemakers (29.5%; 65/220), 4.1% (9/220) retirees and 5 (2.3%) were not employed anywhere. In the past month, 148 (67.3%) individuals attended their workplace and/or frequented some public place. Out of 220 individuals, in the past month preceding the survey, 23 (10.5%) visited a health care facility, 23 (10.5%) went to a government building, 13 travelled by public transport (5.9%), 5 (2.7%) visited a restaurant, and 2 (0.9%) went to a bus stop. Around one-fifth of the study participants had family members (25.0%) and friends (25.9%) who were currently smoking tobacco. There were 24 (10.9%) diabetics, 15 (6.8%) hypertensives, 3 (1.4%) cardiac disease, 2 (0.9%) asthmatic and 1 (0.5%) had chronic obstructive pulmonary disease (COPD).

The SHS exposure at home and workplace was 11.4% (25/220) and 19.1% (27/141), respectively. The SHS exposure at bus stops, health care facilities, public transport, and government buildings was 33.3%, 13.0%, 7.6%, and 3%, respectively. No individual was exposed to SHS in the restaurant. Most survey participants knew that non-smokers could develop serious illnesses from breathing other person's cigarette smoke (95.9%). A high proportion knew that a smoke-free law prohibits smoking in public places (85.9%). The sources of information for this were television (80.9%), the internet (28.6%), newspapers (17.7%) and friends (17.3%).

In the bivariate analysis, at home, having a current smoker family member and or friend significantly increased the chances of exposure to SHS. Outside the home (in the workplace and/or public places) the SHS exposure was significantly more among males (22.8%) as compared to female counterparts (1.2%). Similarly, outside-home illiterates (58.3%) were more significantly exposed to second-hand tobacco smoke than their counterparts (18.4%). The study participants' age and knowledge of second-hand smoke harm had no significant relation to SHS exposure at home or outside the home [Table 1].

Table 1: Predictors of exposure to second-hand smoke among study participants

	Home (N=220)			Outside home* (N=148)		
	Exposed N=25	Non-exposed N=195	Chi-square / p-value	Exposed N= 32	Non exposed N=116	Chi-square/ P value
Age group						
18-35 years	10(10.5)	85(89.5)	0.99;0.61	13(18.1)	59(81.9)	1.27;0.53
36-55 years	8(10.0)	72(90.0)		13(23.6)	42(76.4)	
56 and above	7(15.6)	38(84.4)		6(28.6)	6(28.6)	
Gender						
Male	16(11.8)	120(89.2)	0.06;0.81	31(25.2)	92(74.8)	<i>5.5;0.02</i>
Female	9(10.7)	75(89.3)		1(4.0)	24(96.0)	
Education						
Illiterate	4(10.3)	35(89.7)	0.06; 1.0	7(58.3)	5(41.7)	<i>10.4;0.001</i>
Literate	21(11.6)	160(88.4)		25(18.4)	111(81.6)	
Current smoker family member						
Yes	24(43.6)	31(56.4)	<i>75.8; 0.01</i>	8(22.9)	27(77.1)	0.04;0.84
No	1(0.6)	164(99.4)		24(21.2)	89(78.8)	
Current smoker friend						
Yes	16(28.1)	41(71.9)	<i>21.3; 0.01</i>	12(26.1)	34(73.9)	0.79;0.38
No	9(5.5)	154(94.5)		20(19.6)	82(80.4)	
Knowledge of SHS harm						
Yes	23(10.9)	188(89.1)	1.1;0.27	30(21.0)	113(79.0)	1.0;0.31
No	2(22.2)	7(77.8)		2(40.0)	3(60.0)	

Significant p values are highlighted in italics; *includes workplace and public places

DISCUSSION

The present study inferred that SHS exposure at home was 11.4% and 19.1%, respectively. A survey from Punjab state of India inferred a nearly similar SHS exposure at home (14.5%)¹⁵. However, a much higher proportion has been reported in the Global Adult Tobacco Survey India report 2016-17; wherein the exposure to SHS at home and workplaces was 38.7% and 30.2%, respectively¹⁴. Similarly, a study from Bangladesh reported that the SHS exposure rate at home was 43%.¹⁶ In another study from Myanmar, the reported exposure to SHS was 55.6%.¹⁷

In the current study, SHS exposure at home was more among those having a family member who currently smokes tobacco. The non-smoker family members are thus undesirably put at a serious health risk by their near and dear ones. Similar to our finding, a study from Thailand reported that SHS exposure at home was related to a tobacco smoker household member.¹⁸ In our study, the SHS exposure at home was not significantly related to age and gender. Contrary to this finding, a study from Bangladesh reported that being of a younger age significantly predicted SHS exposure.¹⁶ Studies have inferred that SHS exposure at home was higher among females^{15,19}. Further, our study found that knowledge regarding the harmful effects of SHS had no significant relation to exposure. In contrast to this finding, a study reported a significant association between SHS exposure and knowledge of its harm²⁰.

In our study, the SHS exposure in the workplace and or public places was more among males. A similar finding has been reported in a study by Palipudi in Bangladesh.²¹ Further, in our study, illiterate individuals had significantly higher exposure to SHS in the workplace, though this relationship was not evi-

dent at home. A study by Nan in China reported that the SHS exposure among never-smoking women was higher among illiterates.²²

The strength of this study is assessing exposure to SHS in various settings, including home, workplace and public places. The limitation is that study participants could be under-reporting or over-reporting SHS exposure. Another limitation is that this study was undertaken during the COVID pandemic, which might have impacted people's movement in public places and using public transport facilities for commuting.

In conclusion, the observed level of SHS exposure among non-smokers at home, in the workplace and public places is a public health concern. At home, it was higher among those having a current smoker family member and or friend. In the workplace, the SHS exposure was higher among male study participants and illiterate individuals. It is recommended that at home, the family members should strictly maintain a non-smoking environment. The implementation of smoke-free law should be further strengthened in the workplace and public places. Tobacco smokers should be motivated to quit this evil habit, not only for their interest but also for society.

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