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Research Article

Exposure to environmental tobacco smoke among non-smoker adult females in urban households of Aligarh, India

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ABSTRACT

Background: Environmental tobacco smoke is a serious global public health problem. A better understanding of the correlates of Environmental tobacco smoke exposure could guide the development of evidence based Environmental tobacco smoke exposure reduction interventions. The study is conducted with the objective to describe the pattern of and factors associated with Environmental tobacco smoke exposure among non-smoking adult females in urban areas of Aligarh, Uttar Pradesh, India.
Methods: A total of 439 households were selected by systematic random sampling. One non-smoker adult female was selected randomly from each household. Her exposure to Environmental tobacco smoke was recorded along with socio-demographic characteristic as age, education, occupation, type of family, socio-economic status using a semi-structured questionnaire based on Global Adult Tobacco Survey methodology. Her knowledge regarding harmful effects of Environmental tobacco smoke was also enquired. Data analysis was done using Chi Square test.
Results: Environmental tobacco smoke exposure rate at home among the participants was 33.5%. Females with lower levels of education and lower socio-economic status had higher exposure to Environmental tobacco smoke than their counterparts with the difference being statistically significant. Only 59.2% of the participants considered exposure to Environmental tobacco smoke to be harmful to health with the knowledge being significantly poor in those who were not exposed to Environmental tobacco smoke and had lower levels of education and socio-economic status.
Conclusion: The findings suggest the need for comprehensive tobacco control measures that would improve public understanding about health hazards of Environmental tobacco smoke exposure at home and encourage educational initiatives to promote smoke-free homes.

Keywords: Environmental tobacco smoke, Female, Non-smoker

INTRODUCTION

Environmental tobacco smoke (ETS) is the combination of "side stream" smoke given off by a burning tobacco product and "mainstream" smoke exhaled by a smoker. It is also called second hand smoke (SHS), involuntary smoke, and passive smoke.[1] More than 4000 chemicals have been identified in tobacco smoke, at least 250 of which are known to be harmful more than 50 of which are known to cause cancer.[1]

World health organization (WHO) estimates show that in 2004, 40% of children, 33% of male non-smokers, and 35% of female non-smokers worldwide were exposed to ETS. This exposure was estimated to have caused 6,03,000 deaths in 2004, which was about 1.0% of worldwide mortality. 47% of deaths from ETS occurred in women, 28% in children, and 26% in men.[2]

There has been growing awareness of the health risks posed by ETS and the response to that can be seen in legislations imposed by many countries to reduce or

eliminate exposure to ETS in public places.[3] The Government of India also enacted 'Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) Act, 2003 (COTPA), with ban of smoking in public places being its one of the major provisions.[4] Article 8 of the WHO Framework Convention on Tobacco Control (FCTC) includes guidelines for protection from ETS.[5] In order to achieve 100% smoke-free environments, these guidelines recommend comprehensive bans on smoking in public places and workplaces. Households, however, are not protected under the FCTC and COTPA. As a result, even as smoke-free restrictions in public places are becoming more widespread, the home remains a predominant source of exposure to ETS.[6] By 2008, 160 million people worldwide had been covered by comprehensive smoke-free laws, which leave nearly 90% of the world's population unprotected.[7] Our laws do not limit exposure to ETS in homes where women and children are exposed through the smoking of male family members.

In India only 2.9% females are smokers as compared to 24.3% of male counterparts.[8] As mentioned earlier that as per WHO estimate women was bearing the major brunt of this problem of ETS exposure.[2] In other words we can say that they are paying the price for irresponsible smoking behavior of their male counterparts. This study was conducted with the objective of finding out the extent of exposure to ETS in non-smoking adult females of urban households of Aligarh and to assess the socio-demographic factors associated with this exposure. Knowledge regarding harmful effect of ETS to health was also assessed and socio-demographic correlates for the same were also looked into.

METHODS

The present study is a community based cross-sectional study conducted in urban field practice area of department of community medicine, Jawaharlal Nehru Medical College, Aligarh, Uttar Pradesh. The urban area lies under Jawan block with 1753 registered households and a population of 12288. Approval for the study was taken from the Institutional Ethical Review Committee of Jawaharlal Nehru Medical College, Aligarh. A sample size of 316 approximately was calculated to be studied based on the following factors: an expected 58.2% prevalence of exposure to ETS (as reported by GATS India to be the prevalence of exposure to ETS in Uttar Pradesh);[8] relative precision for the calculated result of 10%; desired confidence level (α) of 0.05; power of the study (1 - β) = 0.80 and a non-response rate of 10%.

A total of 439 households were assessed using systemic random sampling. Household were selected as sampling units and in each house one adult non-smoker female was selected. Our criteria were to include only those households which had a non-smoker female above 18 years of age and were willing to participate in the study. If the household didn't meet our inclusion criteria the very next household was selected for study. In each household one non-smoker female above 18 years of age was randomly selected using lottery method. She was interviewed using a semi-structured proforma based on GATS methodology.[8] Her exposure status to ETS and socio-demographic data as age, education, occupation, type of family, socio-economic status, was recorded. Standard of living index was used to assess socio-economic status. Her knowledge regarding ETS being a health hazard was also assessed.

Data entry and statistical analysis was performed using the Statistical Package for the Social Sciences SPSS 17.0 (SPSS Co Chicago, IL, USA). Differences in exposure to ETS and knowledge regarding its health hazards by socio-demographic characteristics were assessed using Chi-square test. A p value of <0.05 was taken to be statistically significant.

RESULTS

Demographic profile of study participants is shown in Table 1. Majority of study participants (50.1%) were between the ages of 18 – 30 years. Islam was the predominantly practiced religion (69.0%) with 64.5% respondents belonging to nuclear families. Large numbers of study participant (69.5%) were illiterate with only 4.6% having education up to intermediate or above. Very few of the participants (7.7%) were working outside their homes with most of them being homemakers. As per socio-economic status assessed using SLI, 43.5% belonged to higher socio-economic class.

Table 1: Demographic profile of study participants.

Characteristic	Number (%)
Age	
18-30	220 (50.1)
31-45	101 (23.0)
46-60	85(19.4)
>60	33 (7.5)
Religion	
Hinduism	136 (31.0)
Islam	303 (69.0)
Type of Family	
Nuclear	283 (64.5)
Joint	156 (35.5)
Education	
Illiterate	305 (69.5)
Up to primary	57 (13.0)
High school	57 (13.0)
Intermediate and above	20 (4.6)
Occupation	
Homemaker	405 (92.3)
Working outside home	34 (7.7)
Standard of Living Index	
Low	81 (18.5)
Medium	167 (38.0)
High	191 (43.5)

ETS exposure at home was observed in 147 out of the 439 study participants (33.5%). On assessment of ETS exposure with relation to various socio-demographic variables (Table 2) we found that ETS exposure was almost same across various age groups with no statistically significant difference. Increasing levels of education led to a significant reduction in ETS exposure. ETS exposure was 30.7% amongst illiterate females while amongst those having education level of intermediate and above ETS exposure was only 10.0% with the difference being highly significant (p value=0.003). Females who were working outside their home had significantly less exposure to ETS at their homes (17.6%) as compared to those who were homemakers (17.6%). It was also observed that ETS exposure was significantly higher in lower socio-economic class (43.2%) as compared to higher socio-economic class (27.2%). Both Hindus and Muslims had similar exposure, 36.0% & 32.3% respectively. Similarly nuclear and joint families had almost same level of exposure at 32.9% and 34.6% respectively.

Table 2: Association of ETS exposure with socio-demographic variables.

	ETS Exposure		P value
	Yes	No	
Age			
18-30	75 (34.1)	145 (65.9)	0.16
31-45	30 (29.7)	71 (70.3)	
46-60	35 (41.2)	50 (58.8)	
>60	7 (21.2)	26 (78.8)	
Religion			
Hindu	49 (36.0)	87 (64.0)	0.45
Muslim	98 (32.3)	205 (67.7)	
Education			
Illiterate	113 (37.0)	192 (63.0)	
Up to primary	22 (38.6)	35 (61.4)	0.003
High school	10 (17.5)	47 (82.5)	
Intermediate and above	2 (10.0)	18 (90.0)	
Occupation			
Homemaker	141 (34.8)	264 (65.2)	0.04
Working outside her home	6 (17.6)	28 (82.4)	
Type of Family			
Nuclear	93 (32.9)	190 (67.1)	0.71
Joint	54 (34.6)	102 (65.4)	
SLI			
Low	35 (43.2)	46 (56.8)	
Medium	60 (35.9)	107 (64.1)	0.03
High	52 (27.2)	139 (72.8)	

ETS; Environmental Tobacco Smoke, SLI; Standard of Living Index.

Out of the 439 study participants 260 (49.2%) considered ETS exposure to be harmful to health. This knowledge regarding harmful effect of ETS was assessed in relation to certain socio-demographic features of study participants (Table 3). ETS exposure was considered to be harmful to health by 66.4% of study participants in between 18-30 years of age as compared to 48.1% in >60 years of age participants, difference being highly significant (p value = 0.009). Religion and type of family did not affect the knowledge of study participants regarding its harmful impact on health in a significant manner. Whereas 54.4% illiterate respondents considered ETS to be harmful the number increased significantly to 80.0% in respondents having education up to intermediate or above. Standard of living was not found to affect their knowledge regarding health hazards of ETS. 51.9% of participants with low SLI considered ETS to be harmful while 66.0% of high SLI considered ETS to be harmful. Exposure status to ETS significantly impacted knowledge regarding health hazards of ETS. In comparison to 53.8% females not exposed to ETS 70.1% of females exposed to ETS considered ETS exposure to be harmful to health.

Table 3: Association of knowledge regarding harmful effects of ETS exposure with socio-demographic variables.

	ETS Exposure Harmful to health		P value
	Yes	No	
Age			
18-30	146 (66.4)	74 (33.6)	0.009
31-45	58 (57.4)	43 (42.6)	
46-60	41 (48.2)	44 (51.8)	
>60	15 (45.5)	18 (54.5)	
Religion			
Hindu	75 (55.1)	61 (44.9)	0.24
Muslim	185 (61.1)	118 (38.9)	
Education			
Illiterate	166 (54.4)	139 (45.6)	
Up to primary	39 (68.4)	18 (31.6)	0.02
High school	39 (68.4)	18 (31.6)	
Intermediate and above	16 (80.0)	4 (20.0)	
Occupation			
Homemaker	240 (59.3)	165 (40.7)	0.96
Working outside her home	20 (58.8)	14 (41.2)	
Type of Family			
Nuclear	172 (60.8)	111 (39.2)	0.37
Joint	88 (56.4)	68 (43.6)	
SLI			
Low	42 (51.9)	39 (48.1)	0.04
Medium	92 (55.1)	75 (44.9)	
High	126 (66.0)	65 (34.0)	
Exposure to SHS			
Yes	103 (70.1)	44 (29.9)	0.001
No	157 (53.8)	135 (46.2)	

ETS; Environmental Tobacco Smoke, SLI; Standard of Living Index.

DISCUSSION

ETS smoke exposure was found to be fairly common amongst non-smoker adult females in urban households of Aligarh with 33.5% reporting to be exposed to ETS. A large regional disparity in ETS exposure is observed in India.[8] As per GATS 2010, ETS exposure amongst non-smokers ranged from 24.8% in southern India to 62.9% in central states of India[8]. There is a significant geographical variation in the consumption of smoking and smokeless tobacco as well as the type of tobacco products consumed, as described in other studies.[9] This possibly reflects the distinct regional, cultural, religious and social patterns about behaviours related to tobacco[10]. Similar variations in ETS exposure were observed across China in a meta-analysis conducted by He et al.[11] Majority of female respondents in this study were in reproductive age group and ETS exposure amongst 1/3rd of them can lead to serious health hazards not only for them but also to the future newborns.[2] Consistent with previous studies,[3,12-14] our study showed that individuals with lower level of education are more likely to report ETS exposure as compared with their highly educated counterparts. This was substantiated by our findings which showed that education significantly improved the knowledge of study participants regarding harmful effects of ETS. This educational disparity in ETS exposure underscores the need for targeted educational interventions to improve health related knowledge among the less educated and emphasize the promotion of smoke-free home policies to this disadvantaged population group. Socio-economic status also showed a correlation with ETS exposure. Those belonging to lower socio-economic class are more likely to be exposed to ETS. Similar findings have been reported by other authors.[15]

Majority of study participants (59.2%) considered ETS exposure to be harmful to health. This seems to be quite low when we compare with GATS results from India which showed that 81% of females were aware about health hazard of ETS.[8] GATS results also varied across different states.[8] There has been a wide variation in various studies across the world with Brownson et al.[16] from Kansas City reported that 78% were aware about harmful effect of ETS while Nisar et al.[17] from Karachi reporting that only 22% were aware about hazards of passive smoking. This could be attributed to different socio-demographic profile of study participants. Increasing level of education significantly increased the knowledge regarding health impact of ETS. Similar correlation has been observed in earlier studies.[16,17] In our study a whopping 71.6% were illiterate thus attributing to lower level of knowledge in our study as compared to those of GATS. Younger population was more aware of hazards to ETS. Similar results have been reported in prior studies.[8,16,17] Exposure to ETS impacted the knowledge in a significant manner. Those who are exposed are more likely to respond by saying that ETS exposure is harmful to health. This is most likely as they may be experiencing the various short term or long term effects of exposure to ETS.

The study has certain limitations. First, the cross-sectional design of the study limits causal inferences about the findings. Secondly no objective measures of ETS exposure were employed and ETS exposure was recorded in a self reported manner. Thus certain dimensions of exposure as frequency and intensity were missed. But then also this study provides an indication of the possible exposure to ETS and its socio-demographic correlates among non-smokers adult females of urban areas of Aligarh.

CONCLUSION

In our urban households a large number of non-smoking females are exposed to ETS. This being more common in poor and uneducated females. They also lack in satisfactory knowledge regarding the health hazards of ETS. Those exposed were more aware about its harmful effects. On one hand we find that education significantly increased their knowledge regarding health hazard of ETS and reduced their exposure to ETS while on other we find that majority of females are illiterate. COTPA helps people from being exposed to ETS but its efficacy and application is debatable. And even if applied it is at best a short term strategy. Also the protection it provides is limited to public places. It is difficult for any government to propose a law regarding household exposure to ETS and even if done its implementation and regulation will be a mammoth task. Over the past few years initiatives has been taken to reduce smoking in the residential premises in countries like the USA.[18] These strategies can help out in reducing ETS exposure in the urban housing premises in metropolitan cities of India. However, differentials in the housing system may possibly restrict implementing these strategies across India. What can be done in long term is to educate our females to improve health related knowledge regarding ETS exposure and emphasize the promotion of smoke-free home policies. Furthering understanding of the patterns of ETS exposure at home among adult non-smokers and identification of factors that are associated with ETS exposure would guide the development of ETS exposure reduction intervention strategies at home.

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