Research Article

Secondhand smoke exposure among nonsmoker adult females in rural households of Aligarh

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Abstract

Background: Exposure to secondhand smoke (SHS) is a serious global public health problem. Understanding the correlates of SHS exposure could guide the development of evidence-based SHS exposure reduction interventions.

Objective: To describe the pattern of and factors associated with SHS exposure among nonsmoking adult females in rural areas of Aligarh, Uttar Pradesh, India.

Materials and Methods: The study was conducted in rural field practice areas of Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh, Uttar Pradesh. A total of 320 households were selected by systematic random sampling. In each household, one nonsmoker adult female was selected randomly. Her exposure to SHS was recorded along with sociodemographic characteristics such as age, education, occupation, type of family, and socioeconomic status using a semi-structured questionnaire based on Global Adult Tobacco Survey methodology. Her knowledge regarding harmful effects of SHS was also enquired. Data were analyzed using χ^2-test.

Results: The SHS exposure rate at home among the participants (N = 320) was 32.8%. Several sociodemographic factors were associated with SHS exposure. The higher the level of education, the lower the SHS exposure, with the difference being statistically significant.

Conclusion: Almost one-third of nonsmoking adult females are exposed to SHS at home. The findings suggest the need for comprehensive tobacco control measures that would improve public understanding about health hazards of SHS exposure at home and encourage educational initiatives to promote smoke-free homes. Interventions should deliver targeted messages to reach those in the low socioeconomic status group.

KEY WORDS: Secondhand smoke, female, nonsmoker

Introduction

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

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As per the World Health Organization (WHO) estimates, 40% children, 33% male nonsmokers, and 35% female nonsmokers worldwide were exposed to SHS in 2004. This exposure was estimated to have caused 379,000 deaths from ischemic heart disease, 165,000 deaths from lower respiratory infections, 36,900 deaths from asthma, and 21,400 deaths from lung cancer. SHS was responsible for 603,000 deaths in 2004, which was about 1.0% of worldwide mortality. Of deaths due to SHS, 47% occurred in women, 28% in children, and 26% in men.[2]

Awareness of the health risks posed by SHS has been growing and the response to that can be seen in legislations

imposed by many countries to reduce or eliminate exposure to SHS in public places.[3] The Government of India enacted Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) Act, 2003 (COTPA), of which one of the provisions is ban of smoking in public places.[4] Article 8 of the WHO Framework Convention on Tobacco Control (FCTC) includes guidelines for protection from SHS.[5] These guidelines recommend comprehensive bans on smoking in public places and workplaces to achieve 100% smoke-free environments. 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 SHS.[6] By 2008, 160 million people worldwide had been covered by comprehensive smoke-free laws, nearly 90% of the world's population is not protected, and laws do not limit exposure to SHS in homes where women and children are exposed through the smoking of male family members.[7]

As we see that as per the WHO estimates women were bearing the major brunt of this problem of SHS,[2] this becomes much more important in country such as India where only 2.9% females are smokers as compared to 24.3% male counterparts.[8] This study was conducted with the objective of finding out the extent of exposure to SHS in nonsmoking adult females of rural households of Aligarh and to assess the sociodemographic factors associated with this exposure. Knowledge regarding harmful effects of SHS to health was also assessed and sociodemographic correlates for the same were looked into. Further understanding of the patterns of SHS exposure at home among adult nonsmokers and identification of factors that are associated with SHS exposure would guide the development of SHS exposure reduction intervention strategies at home.

Materials and Methods

This was a community-based cross-sectional study conducted in rural field practice area of Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh, Uttar Pradesh, India. The rural area lies under Jawan block with 2,422 registered households and a population of 14,082. 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 SHS [as reported by Global Adult Tobacco Survey (GATS) India to be the prevalence of exposure to SHS in Uttar Pradesh][8]; relative precision for the calculated result of 10%; desired confidence level (α) of 0.05; power of the study ($1 - \beta$) = 0.80; and a nonresponse rate of 10%.

A total of 320 households were assessed using systemic random sampling. Households were selected as sampling units and in each house one adult nonsmoker female was selected. Our inclusion criteria were to include only those households that had a nonsmoker female above 18 years of age and were willing to participate in the study. If the household did not meet our inclusion criteria, the very next household was selected for study. In each household, one nonsmoker female above 18 years of age was randomly selected using lottery method. She was interviewed using a semi-structured pro forma–based on GATS methodology.[8] Her exposure status to SHS and sociodemographic data such as age, education, and socioeconomic status was recorded. Standard of living index was used to assess socioeconomic status. Her knowledge regarding SHS being a health hazard was also assessed.

Table 1: Demographic profile of study participants

Characteristic	Number (%)
Age (years)	
18–30	152 (47.5)
31–45	75 (23.4)
46–60	66 (20.6)
>60	27 (8.4)
Religion	
Hinduism	135 (42.2)
Islam	185 (57.8)
Type of family	
Nuclear	194 (60.6)
Joint	126 (39.4)
Education	
Illiterate	229 (71.6)
Up to primary	34 (10.6)
High school	40 (12.5)
Intermediate and above	17 (5.3)
Occupation	
Homemaker	302 (94.4)
Others	18 (5.6)
SLI	
Low	74 (23.1)
Medium	117 (36.6)
High	129 (40.3)

SLI, standard of living index.

Data entry and statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) software, version 17.0 (SPSS, Chicago, IL). Differences in exposure to SHS and knowledge regarding its health hazards by sociodemographic characteristics were assessed using χ^2-test. A *p*-value of <0.05 was considered to be statistically significant.

Results

Demographic profile of study participants (Table 1) showed that majority (47.5%) were between the ages of 18 and 30 years. Nuclear families were more common (60.6%) and 57.2% households practiced Islam as religion. Majority

Table 2: Association of SHS exposure with sociodemographic variables

	SHS exposure		*p*-Value
	Yes	No	
Age (years)			
18–30	53 (34.9%)	99 (65.1%)	0.80
31–45	25 (33.3%)	50 (66.7%)	
46–60	27 (40.9%)	39 (59.1%)	
>60	10 (37.0%)	17 (63.0%)	
Religion			
Hindu	48 (35.6%)	87 (64.4%)	0.90
Muslim	67 (36.2%)	118 (63.8%)	
Education			
Illiterate	93 (40.6%)	136 (59.4%)	**0.04**
Up to primary	10 (29.4%)	24 (70.6%)	
High school	9 (22.5%)	31 (77.5%)	
Intermediate and above	3 (17.6%)	14 (82.4%)	
Type of family			
Nuclear	66 (34.0%)	128 (66.0%)	0.38
Joint	49 (38.9%)	77 (61.1%)	
SLI			
Low	34 (45.9%)	40 (54.1%)	**0.04**
Medium	44 (37.6%)	73 (62.4%)	
High	37 (28.7%)	92 (71.3%)	

SLI, standard of living index.

(70.6%) of participants were illiterate, with only 5.3% having education up to intermediate or above. Very few of the participants (5.6%) were working outside their homes, with majority being homemakers. As per socioeconomic status assessed using standard of living index (SLI), 40.3% belonged to higher socioeconomic class.

Of the 320 study participants, 105 (32.8%) were reported to be exposed to SHS at home. On assessment of SHS exposure with relation to various sociodemographic variables (Table 2), we found that SHS exposure was almost same across various age groups with no statistically significant difference. Both Hindus and Muslims had similar exposure of 35.6% and 36.2%, respectively. Similarly, nuclear and joint families had almost same level of exposure at 34.0% and 38.9%, respectively. With increase in education, a significant reduction in SHS exposure was noticed. SHS exposure was 40.6% among illiterate females whereas it was 17.6% among those having education level of intermediate and above. We also found that SHS exposure was significantly higher in lower socioeconomic class (45.9%) as compared to higher socioeconomic class (28.7%).

Of the 320 study participants, 187 (58.4%) considered SHS exposure to be harmful to health. This knowledge regarding harmful effect of SHS was assessed in relation to certain sociodemographic features of study participants (Table 3). Younger age groups were more aware about harmful effect of SHS as compared to the elder population. Of the study participants, 67.8% aged between 18 and 30 years considered SHS exposure to be harmful to health

Table 3: Association of knowledge regarding harmful effects of SHS exposure with sociodemographic variables

	SHS exposure harmful to health		*p*-Value
	Yes	No	
Age (years)			
18–30	103 (67.8)	49 (32.2)	**0.006**
31–45	42 (56.0)	33 (44.0)	
46–60	29 (43.9)	37 (56.1)	
>60	13 (48.1)	14 (51.9)	
Religion			
Hindu	75 (55.6)	60 (44.4)	0.22
Muslim	112 (60.5)	73 (39.5)	
Education			
Illiterate	123 (53.7)	106 (46.3)	**0.03**
Up to primary	22 (64.7)	12 (35.3)	
High school	28 (70.0)	12 (30.0)	
Intermediate and above	14 (82.4)	3 (17.6)	
Type of family			
Nuclear	119 (61.3)	75 (38.7)	0.12
Joint	68 (54.0)	58 (46.0)	
SLI			
Low	39 (52.7)	35 (47.3)	0.14
Medium	63 (53.8)	54 (46.2)	
High	85 (65.9)	44 (34.1)	
Exposure to SHS			
Yes	81 (70.4)	34 (29.6)	**0.001**
No	106 (51.7)	99 (48.3)	

SLI, standard of living index.

as compared to 48.1% in the >60 years age group. Religion and type of family did not affect the knowledge of study participants regarding its harmful impact on health in a significant manner. The higher the education, the more the awareness was regarding health hazards of SHS. Whereas 53.7% illiterate respondents considered SHS to be harmful, the number increased significantly to 82.4% in respondents having education up to intermediate or above. Standard of living was not found to affect their knowledge regarding health hazards of SHS. Of the participants, 52.7% with low SLI and 65.9% with high SLI considered SHS to be harmful. Exposure status to SHS significantly impacted knowledge regarding health hazards of SHS. In comparison to 51.7% females not exposed to SHS, 70.4% females exposed to SHS considered SHS exposure to be harmful to health.

Discussion

SHS exposure was found to be fairly common among nonsmoker adult females in rural households of Aligarh, with 32.8% reporting to be exposed to SHS. A large regional disparity in SHS exposure is observed in India.[8] As per GATS 2010, SHS exposure among nonsmokers ranged from 24.8% in southern India to 62.9% in central 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 behaviors related to tobacco.[10] Similar variations in SHS 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 SHS exposure among one-third 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 SHS 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 SHS. This educational disparity in SHS 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. Socioeconomic status also showed a correlation with SHS exposure. Those belonging to lower socioeconomic class are more likely to be exposed to SHS. Similar findings have been reported by other authors.[15]

Majority of study participants (58.44%) considered SHS exposure to be harmful to health. This seems to be quite low when we compare with GATS results that showed 81% females were aware about health hazards of SHS.[8] GATS results also varied across different states.[8] There has been a wide variation in various studies across the world with Nisar et al.[16] from Karachi reporting that only 22% were aware about hazards of passive smoking whereas Brownson et al.[17] from Kansas City reported that 78% were aware about harmful effect of SHS. This could be attributed to different sociodemographic profiles of study participants. Increasing level of education significantly increased the knowledge regarding health impact of SHS. Similar correlation has been observed in earlier studies.[18] 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 the hazards to SHS exposure. Similar results have been reported in earlier studies.[8,16,17] Exposure to SHS impacted the knowledge in a significant manner. Those who are exposed are more likely to respond by saying that SHS exposure is harmful to health. This is most likely as they may be experiencing the various short- or long-term effects of exposure to SHS.

The study has certain limitations. First, the cross-sectional design of the study limits causal inferences about the findings. Second, no objective measures of SHS exposure were taken and SHS 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 SHS and its sociodemographic correlates among nonsmoker adult females of rural areas of Aligarh.

Conclusion

Large number of nonsmoking females in our rural households is being exposed to SHS. The phenomenon is more common in poor and uneducated females. Their knowledge regarding hazards of SHS is also not satisfactory. Those exposed were more aware about its harmful effects. On the one hand, we find that education significantly reduced the exposure to SHS and increased their knowledge regarding health hazards of SHS. On the other hand, we find that majority of females are illiterate. We are having laws such as COTPA act that help people from being exposed to SHS but its efficacy and application in far-off rural areas is debatable. Even on application it is best as a short-term strategy and provides protection only in public places. Strict implementation of any rules and regulations at home is difficult to propose by any government. Over the past few years, initiation has been made to reduce smoking in the residential premises in countries such as the USA.[18] These strategies can help out in reducing SHS exposure in the urban housing premises in India. However, differentials in the housing system may possibly restrict implementing these strategies in the rural India. What can be done in long term is to educate our females to improve health-related knowledge regarding SHS exposure and emphasize the promotion of smoke-free home policies.

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