

Second hand smoke exposure in pregnant women in Dehradun, Uttarakhand: A cross sectional study

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ABSTRACT

Aim: The aim of this study was to estimate the percentage and sources of secondhand smoke (SHS) exposure among non-smoking pregnant women. It was a cross-sectional study conducted among the non-smoking pregnant women registered at the primary health center (PHC) under the All India Institute of Medical Science (AIIMS), Rishikesh. **Materials and Methods:** All registered pregnant women at sub-center in the field practice area (Raiwala) of the Department of Community and Family Medicine, AIIMS Rishikesh were recruited in the study. In this study, a questionnaire was used for measuring the exposure of SHS. Mean and standard deviation (SD), median, minimum, and maximum were used for continuous variables. A Chi-square test was used to compare the association of categorical variables. **Results:** Out of the total participants, 62% were exposed to SHS. 33% of participants were exposed to SHS at home only, 24% at public places only, and 5% were the ones exposed both at home and public places. More than half (69%) of the participants were having inadequate knowledge about the harms caused by SHS. **Conclusions:** More than half of the participants were exposed to SHS. Inadequate knowledge among the participants about adverse effects of SHS exposure and insufficient practices and action were observed.

Keywords: Environmental smoke exposure, passive smoke, pregnant women, secondhand smoke

Introduction

According to a World Health Organization (WHO) report, over 7 million people die each year due to tobacco translating to nearly one smoking-related death every 5 s.^[1] The tobacco epidemic in itself is a significant public health problem. It is estimated that more than 1.3 million lives are lost due to tobacco in India.^[2] Globally about 1.2 million premature deaths occur due to secondhand smoke exposure (SHS).

SHS is also known as environmental smoke, passive smoke, and involuntary smoke.^[3] It is composed of gasses and particles

containing various toxic and carcinogenic compounds, which are released as byproducts of indoor smoking.^[4] The exposure mainly contains the smoke released from the burning end of a cigarette, pipe, or cigar ("side-stream smoke" 85%) and, to some extent also the smoke exhaled by an active smoker nearby.^[5] SHS exposure can occur either at home or other places including workplaces, hospitals, theaters, restaurants, public transport, and nightclubs.

A large body of epidemiological research has established a link between SHS exposure and increased fatalities and morbidity.^[3] It causes more than 1.2 million premature deaths per year.^[6] SHS exposure for a long time on average is suggested to be almost equally detrimental to chronic smoking.^[7] It can be affecting the population, which may be even cautious about tobacco smoke; however, still are involuntarily exposed to tobacco smoke.

Women, the elderly, and children are the ones who are among the vulnerable group of the population.^[8]

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Secondhand smoke and maternal health

Exposure to SHS during pregnancy is harmful to both the fetus and mother as it leads to decreased birth weight of infants, and there is an increased risk of fetal congenital malformation, premature birth, stillbirth, depression, and pre-eclampsia.^[8-10]

Although SHS exposure during pregnancy has harmful effects on fetal health, there is very little knowledge about the levels of SHS exposure in pregnant women. There are scarcely any studies on SHS exposure and its prevalence and knowledge in pregnant women in India.^[9] Monitoring of SHS exposure in pregnant women by primary healthcare and family physicians during anti-natal visits and informing them about the harms of SHS exposure can be a valuable step toward reducing the exposure in this vulnerable group of population.

Assessment methods

Assessment of SHS can be done in different methods. There are studies worldwide conducted that measure exposure to SHS using questionnaires as a tool of assessment. Questionnaires were categorized as secondary indicators for measuring SHS. Primary indicators or the confirmatory test can be done by examining the presence of biomarkers such as cotinine in blood, urine, or saliva. Because there is no safe level for SHS, even the prevalence of tobacco smoking in the area is also a kind of surrogate indicator.^[11]

In this study, surrogate and indirect measures were used for measuring the exposure of SHS.

Although there are limited studies in India assessing SHS exposure among pregnant women, but there are few studies assessing the Knowledge, attitude and practices are available for Uttarakhand. The aim of the study was to estimate the percentage and sources of SHS exposure among non-smoking pregnant women registered at the primary health center (PHC) Raiwala, under AIIMS, Rishikesh.

This study was conducted to estimate the percentage of SHS exposure in pregnant women. Knowledge and attitude toward SHS risk were also assessed.

Materials and Methods

The study was conducted at all, that is, three sub-centers under PHC Raiwala, Doiwala Block, rural field practice areas of the Department of Community and Family Medicine, All India Institute of Medical Science (AIIMS), Rishikesh. It was a cross-sectional study with a universal sampling method. All registered pregnant women at the sub-center in the field practice area (Raiwala) of the Department of Community and Family Medicine, AIIMS Rishikesh during the period from October 15, 2020, and November 15, 2020, were recruited in the study.

Data collection tool

Schedule for data collection

A predesigned, pretested semi-structured interview schedule was prepared and translated into the local language (Hindi).

The interview schedule was divided into the following sections:

- (i) Socio-demographic factors
- (ii) SHS exposure variables
- (iii) Information regarding knowledge and perception about adverse effects of SHS exposure
- (iv) Information on attitude and actions taken by pregnant women toward SHS exposure.

The data were collected using the house-to-house visit method in the selected areas. Help from Accredited Social Health Activist (ASHA) was sought to identify such households, where the study participant was residing. During the visits in the identified households, rapport building was done firstly, then the consent of participants was taken and they were ensured about the maintenance of confidentiality. Time taken to fill one form was approximately 20 to 25 min and after the interview schedule was finished, the study participant was advised about protection from SHS exposure and its importance and the interview was closed. The subsequent visit was made when the informer was not present during the first visit.

Data entry was done using Epi info 3.5.1 application on a mobile device. Collected data were then exported to IBM SPSS (Statistical Package for Social Sciences) version 23.0 for data analysis.

Descriptive statistics were calculated for all study variables. Variables included socio-demographic information of participants, variables about SHS exposure at home and workplace, variables about SHS exposure at public places. "Anyone smokes at home?" was the question taken as a dependent variable as a proxy for SHS exposure at home. The distribution of data variables such as the relation with the smoker, type of smoker, and household restrictions was presented in frequencies and percentages. Mean and standard deviation (SD), median, minimum and maximum were used for continuous variables. A Chi-square test was used to compare the association of categorical variables. The level of significance was determined at P value < 0.05 and two-sided significance was used.

Ethical considerations

The study was started after getting ethical approval from the Institutional Ethics Committee, AIIMS Rishikesh (Ref no. AIIMS/IEC/21/).

Measurements

Adequate and inadequate knowledge

Pregnant women were asked to answer the following questions to evaluate their knowledge: "What are the diseases you think are caused by tobacco smoke inhaling?", "Do you think that children living with smokers are more likely to have asthma or other respiratory diseases?", "Do you think that women with a smoking husband are more likely to get lung cancer than other women?" and "Do you think that passive smokers are more likely to have heart disease?" Participants were given one point

for each question answered correctly. For multiple response questions regarding diseases, one point was given if more than two options were selected. The total knowledge score ranged from 0 to 5. The score above the median value demonstrated adequate knowledge.

Attitude

Participants were asked about their opinion regarding banning smoking in public places, selling cigarettes to minors, and banning all cigarette advertisements. One point per place was given. Those who agreed with all three policies were regarded as having a positive attitude toward tobacco control policies.

Results

The mean age of the study participants was 25.84 with an SD of 4.072. The baseline characteristics of the participants are described in Table 1.

Out of the total participants (100), 62 (62%) were exposed to SHS. The distribution of exposed participants [Figure 1] was as follows. 33% of participants were exposed to SHS at home only, 24% at public places only, and 5% were the ones exposed both at home and public places.

Table 1: Distribution of the study participant according to the socio-demographic variables (n=100)

| Socio demographic variables | Sub-categories | Frequency (n) | Percentage |
|-----------------------------|----------------------------|---------------|------------|
| Age groups (years) | 18-24 years | 41 | 41 |
| | 25-29 years | 43 | 43 |
| | 30-34 | 12 | 12 |
| | ≥35 years | 4 | 4 |
| | Mean age | 25.84±4.072 | |
| Religion | Hindu | 96 | 96 |
| | Muslim | 4 | 4 |
| | Others* | 0 | 0 |
| Marital status | Single | 0 | 0 |
| | Married | 100 | 100 |
| | Divorced/Widowed/Separated | 0 | 0 |
| Children | No | 42 | 42 |
| | Yes | 58 | 58 |
| Education status | Illiterate | 7 | 7 |
| | Professional | 2 | 2 |
| | Graduate/Intermediate | 35 | 35 |
| | High School | 21 | 21 |
| | Primary/Middle School | 35 | 35 |
| Socio-economic Status | Upper (I) | 1 | 1 |
| | Upper Middle (II) | 13 | 13 |
| | Lower Middle (III) | 9 | 9 |
| | Upper Lower (IV) | 63 | 63 |
| | Lower (V) | 14 | 14 |
| Occupation | Unemployed | 14 | 14 |
| | Employed | 4 | 4 |
| | Retired | 0 | 0 |
| | Homemaker | 82 | 82 |
| | Total | 100 | 100 |

Out of pregnant women exposed to SHS at home, only nine had ever asked to stop smoking in the house. Out of the 28 participants, those who did not ask, 20 responded that they did not have any problem with smoke, 4 were afraid to ask the smoker, and the rest 4 gave their answer that their husband did not listen to them.

Out of the participants having smoke exposure at home, 60.5% of participants reported that their husbands smoke and 34.2% reported father-in-law as a smoker in the house. The family member who smokes among the 28 (78.37%) participants out of 38 are regular smokers. Only 10 of them were occasional smokers.

None of the study participants exposed to SHS at home had any household restriction to smoking or any smoking ban law at their homes. Most participants (33) reported that someone smokes daily at their home. Only 24 participants responded to question regarding the daily cigarette consumption of the family member. The average cigarette consumption of smokers on daily basis was 8.13 ± 3.87 SD.

Half of the participants reported that they took their health-related decisions by themselves. Decisions of other participants were taken by their husbands or other family members. Other family members included the brother-in-law or mother-in-law of the study participant. *P* value was significant (> 0.05) for this factor. Variables were dichotomized by grouping self and husbands, father-in-law, and the other category.

Out of the total participants exposed to SHS at home, as mentioned in the Table 2, decisions related to the health of the majority 28 (73.7%) were taken by their husbands and other family members. This was found to be significantly associated with exposure to SHS at home with a *P* value > 0.05 .

Exposure at public places

Public transports were the most common place where study participants were exposed among public places. Twenty-five (89.3%) were exposed in public transport, 3 (10.3%) in restaurants, and 1 (3.6%) in a healthcare facility. No exposure was reported in government facilities or educational institutes.

Out of 29 pregnant women who reported exposure in a public place, the majority 18 (62.1%) avoided or ignored during the time of exposure at the public place. Eight (27.6%) of them asked the smoker to stop smoking and only one complained and the rest two participants had no problem with SHS exposure at a public place.

Out of the total study participants, 66% of the participants were aware that exposure to SHS can cause respiratory diseases. Despite being aware of respiratory disease as an adverse effect of SHS 39 (63.9%) of them were exposed to SHS. Out of 27 participants who were having knowledge that SHS can cause cancer, 13 (48.1%) were exposed to SHS. Thirteen (13%) of them

Table 2: Distribution of factors according to their association with secondhand smoke exposure at home

| Factor | Sub-category | Frequency | SHS at home (n=38) | P |
|--------------------------|----------------------------|-----------|--------------------|-------|
| Health-related decisions | Self | 64 (640) | 10 (26.3) | 0.00* |
| | Husband/other [#] | 36 (36) | 28 (73.7) | |
| Household restrictions | No Restrictions | 38 (38) | 38 (100) | 0.16 |
| Knowledge | Adequate | 53 (53) | 14 (36.8) | 0.01* |
| | Inadequate | 47 (47) | 24 (63.2) | |

[#]Merged category, *P<0.05

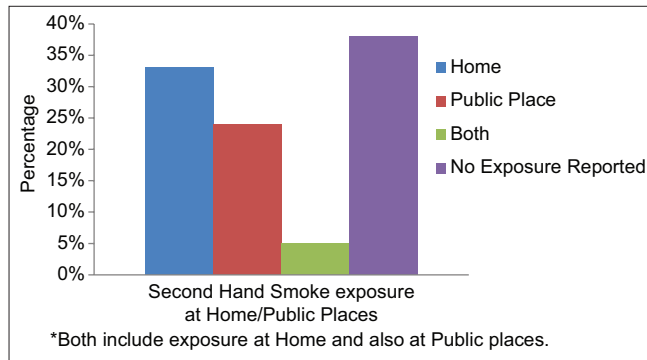


Figure 1: Distribution of study participants according to the proportion of Second-hand smoke exposure at home and public places

responded that SHS can cause cardiovascular diseases, of which 8 (61.5%) reported SHS exposure. Thirty (30%) responded that they did not know what diseases SHS can cause, out of which most (20) were exposed to SHS. Only two (2%) of the women were knowledgeable about all the diseases SHS can cause due to its exposure.

Knowledge, attitude, and practice

Study participants were divided into two categories: inadequate knowledge and adequate knowledge based on the score calculated by summing up the correct responses of participants to the questions asked in the knowledge section. The median observed for knowledge of the participants was 4.

More than half (69%) of the participants were having inadequate knowledge about the harms caused by SHS.

Few of them (31%) were having adequate knowledge about the adverse effects of SHS. A majority (39, 39%) of participants responded with television as a source of their knowledge.

Most of the participants 24 (63.2%) exposed to SHS at home were having inadequate knowledge. Knowledge about adverse effects of SHS exposure in study participants was also found to be associated with SHS exposure at home.

Most 95 (95%) of the participants agreed with banning smoking in public places and selling cigarettes to minors.

Also, 82% (82) of the total participants (100) responded that they avoided SHS exposure, whereas 18 (18%) of them responded that they took no action about SHS exposure.

Healthcare providers

Next, 14% (14) of the study participants in total (100) were asked about SHS exposure, and 15 (15%) were informed about SHS and its adverse effects by health care providers.

Summary and Conclusion

This study determined the prevalence of SHS exposure among pregnant women in Dehradun, Uttarakhand, using a pretested questionnaire. We found that 62% of participants were exposed to SHS. Data also indicated inadequate knowledge among 69% of the participants about the adverse effects of SHS exposure in pregnant women. Practices and actions taken by pregnant women were found to be insufficient. Also, there was a positive attitude among participants against tobacco banning laws. Knowledge was found to be associated with SHS exposure. Therefore, there is a need for interventions to increase knowledge among pregnant women and empower women to take action against smoking behavior in public places or at home. Advising about a smoke-free environment during Ante-natal care (ANC) visits and providing information on harmful effects of SHS by primary healthcare physicians can be an influential factor in reducing SHS exposure. Compliance with the same should be strictly monitored.

The findings of this study can be used as a shred of evidence for further policy implications against tobacco to protect exposure in vulnerable populations.

Limitations

- Our study used a questionnaire as a method for assessing SHS exposure due to the limited time and resources.
- There can be a risk of recall bias in this study because participants may not be able to remember exact information about the smoking behavior of the person smoking in the house. All variables are self-reported; therefore, there can be underreporting of the exposure. Women may not report the smoking of their husbands or family members to avoid criticism or to give a socially desired response. Although there are very rare chances of exposure being over-reported.

Recommendations

- Smoke-free homes should be promoted and women should be advised about strategies to maintain a smoke-free environment.
- During anti-natal visits, healthcare providers or primary healthcare physicians should ask pregnant women about their

exposure to SHS and inform them about the harms of SHS exposure.

- Behavioral interventions and training programs should be implemented to support pregnant women to enhance self-efficacy.
- A component including the law for the protection of pregnant women from SHS exposure can be incorporated in the COTPA (Cigarettes and Other Tobacco Products Act).
- Comprehensive smoking ban law should be considered after further research on the prevalence of SHS exposure in the nation using confirmatory tests.

Key messages

Smoke-free homes should be promoted and healthcare providers such as primary health care physicians should ask pregnant women about their exposure to SHS and inform them about the harms of SHS exposure during anti-natal visits.

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Conflicts of interest

There are no conflicts of interest.

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