

Prevalence of Second-hand and Third-hand Smoke Exposure among the Medical and Dental Students

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ABSTRACT:

Aim: The main objective was to estimate the prevalence of second-hand smoke (SHS) and third-hand smoke (THS) exposure among the medical and dental students of selected institutes in Bangladesh. **Methods:** It was a cross-sectional study conducted in March-November, 2014. A total of 501 students were selected by systematic sampling method from two medical colleges [(one govt. and one private)-Dhaka Medical College & East-West Medical College] and two dental colleges [(one govt. and one private)-Dhaka Dental College & Update Dental College] in Dhaka city, Bangladesh. Data were collected using pretested semi-structured questionnaire by face-to-face interview. First year to final year medical and dental students of mentioned institutes were the population of this study. **Results:** Among the respondents 52.3% were male and 47.7% were female. About 86% respondents were nonsmoker. From this study it was found that among the nonsmoker respondents almost all (94.4%) respondents were exposed to SHS. Indoor places were most common site followed by outdoor places for SHS exposure. More than two-third (70.5%) respondents were exposed to THS. Prevalence of THS exposure was more common at institute and home. Prevalence of SHS and THS exposure was significantly associated with gender of the respondents. **Conclusion:** The study revealed that, prevalence of students exposed to SHS and THS exposure were very high. Efforts should be made to plan strategy to promote smoke-free policies to protect non-smokers from SHS and THS exposure.

Key words: Prevalence, second-hand smoke exposure, third-hand smoke exposure

INTRODUCTION:

Tobacco epidemic is one of the biggest public health threats the world has ever faced.

Tobacco is the leading preventable cause of death in the world today and a major contributor to the increasing burden of non-communicable diseases. The tobacco epidemic is one of the biggest public health threats the world has ever faced, killing nearly six million people a year. More than five million of those deaths are the result of direct tobacco use while more than 6,00,000 are the result of non-smokers being exposed to second-hand smoke. Approximately one person dies every six seconds due to tobacco, accounting for one in 10 adult deaths.¹⁻² Most of the studies are on smoking but there is less emphasis on secondhand smoke (SHS). Moreover third-hand smoke (THS) is an emerging health concern and the magnitude of the public health threat presented by this exposure is not fully known. Passive smoking is the inhalation of smoke, called second-hand smoke, by persons other than the intended "active" smoker. It occurs when tobacco smoke permeates any environment, causing its inhalation by people within that environment. When one breathes in smoke that comes from the end of a lit cigarette, cigar, or pipe (side stream smoke, 80-90%) or that is exhaled by a smoker (mainstream smoke, 10-20%) one's inhaling almost the same amount of chemicals as the smoker breathes in.³ Second-hand smoke causes many of the same diseases as direct smoking. Evidence suggests that exposure to SHS increases the lifetime risk of coronary heart disease by 25-30% and the risk of lung cancer by 20-30% in non-smokers.⁴ 'Third-hand smoke' is a relatively new term used to describe the residual contamination from tobacco smoke that lingers in rooms long after smoking stops and remains on our clothes after we leave a smoky place. There is a growing body of evidence that this lingering tobacco residue has significant health risks.⁵ The term third-hand smoke first appeared in the medical literature in 2009 when investigators defined it as residual tobacco smoke contamination that remains after the cigarette is extinguished.⁶ A recent study found that nicotine persists

in homes previously occupied by smokers and that non-smokers who move into these homes have elevated levels of nicotine on their skin and in body fluids.⁷ The message from research on third-hand smoke is clear: health hazards attributable to cigarette smoking persist long after the cigarette is extinguished.⁸ Exposure to THS can occur through inhalation, ingestion and dermal contact, and THS has become an increasing public health concern. However, little is known about its toxicity.⁹

MATERIALS & METHODS:

It was a cross-sectional study conducted in March-November, 2014. After getting the permission of ethical review board of Bangladesh Medical Research Council (BMRC) the four institutes were selected by random sampling. All the students were listed. Then total of 501 students were selected by systematic sampling method from two medical colleges [(one govt. and one private)-Dhaka Medical College & East-West Medical College] and two dental colleges [(one govt. and one private)-Dhaka Dental College & Update Dental College]. Before data collection permission was taken from institution heads & individuals also. Data were collected using pretested semi-structured questionnaire by face to face interview. After pre-test all necessary changes & modifications were done as required. First year to final year medical and dental students of mentioned institutes were the population of this study.

For data analysis SPSS-20 version was used. Categorical data were presented as frequency, percentage. And their association was made by chi square test. Numeric data were presented as mean and standard deviation.

RESULTS:

Table: 1 Distribution of the respondent by age & gender (n=501)

	Frequency	Percentage	Mean \pm SD
Age (Year)			
18-20	183	36.5	21.2 \pm 1.6
21-23	275	54.9	
24-26	43	8.6	
Gender			
Male	262	52.3	
Female	239	47.7	
Total	501	100	

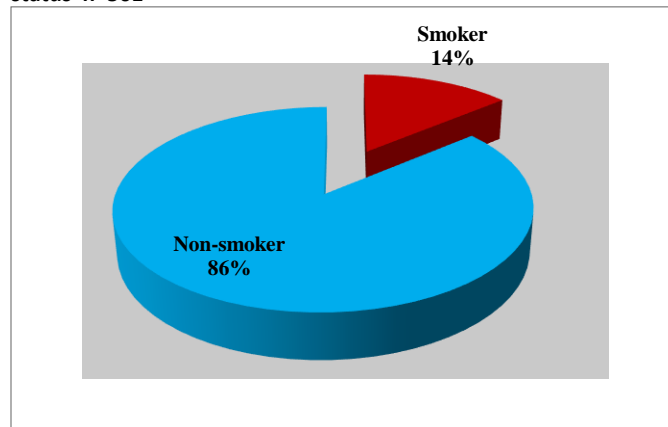
In this cross sectional study to estimate prevalence of Second-hand and Third-hand Smoke exposure among the medical and dental students a total of 501 students were selected by systematic sampling. Their age ranged from 18-26 years. More than half of the respondents (54.9%) were from 21 to 23 years of age and the mean age was 21.21 \pm 1.68 years. Again 52.3% respondents were male and 47.7% were female (Table 1).

Table: 2 Distribution of the respondents by Institute type (n=501)

	Govt. (n, %)	Private (n, %)	Total (n, %)
Medical	241(48.1)	105(21.0)	346(69.1)
Dental	104(20.8)	51(10.2)	155(30.9)
Total	345(68.9)	156(31.1)	501(100)

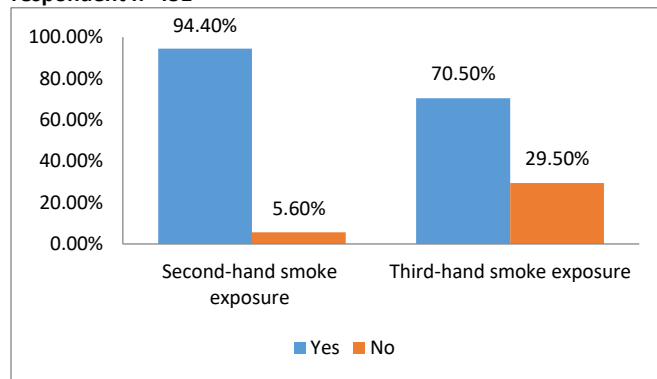
Among the respondents 69.1% were medical students and the rest 30.9% were dental students. Again 68.9% were from govt. and 31.1% from private institutes (Table 2).

Figure: 1 Distribution of the respondents by their current smoking status n=501



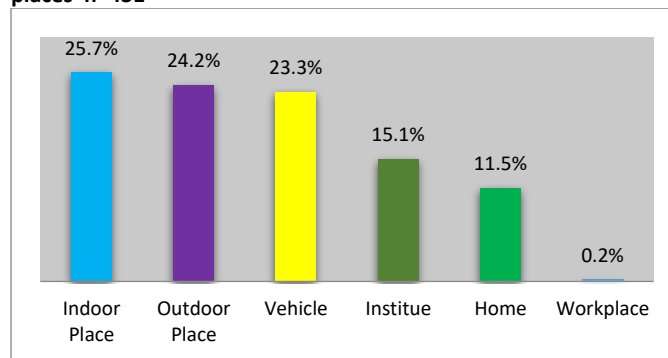
Only 14% respondents were smoker (Figure 1).

Figure: 2 Prevalence of second-hand smoke exposure among the respondent n=431

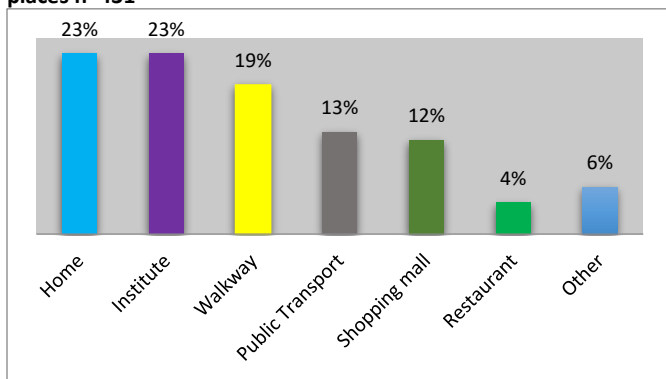


Among the non-smoker respondents (n=431) of this study it was found that almost all (94.4%) respondents were exposed to second-hand smoke. Among the non-smoker respondents it was found that 70.5% respondents were exposed to third hand smoke (Figure 2)

Figure: 3 Prevalence of second-hand smoke exposure at different places n=431



For the non-smoker respondents according to their site of second-hand smoke exposure indoor places were most common site (25.7%) followed by 24.2% at outdoor places, 23.3% at vehicle, 15.1% at institute, 11.5% at home and 0.2% were exposed at their workplace (Figure 3).

Figure: 4 Prevalence of third-hand smoke exposure at different places n=431

*Others- Tea-stall, Hospital, Bus-stand.

The non-smoker respondents were asked about the prevalence of third-hand smoke exposure at different places. It was found that 23% respondents were exposed at institute & home, 19% were at walkway, 13% were at public transport, 12% were at shopping-mall, 4% were at restaurant and 6% were exposed at other places (Figure 4).

Table: 3 Association of prevalence of second-hand smoke exposure and third-hand smoke exposure with gender of the respondent n=431

Gender of the respondent	Prevalence of 2 nd -hand smoke		p value	Prevalence of 3 rd -hand smoke		p value	Total (n,%)
	No (n,%)	Yes (n,%)		No (n,%)	Yes (n,%)		
Male	5 (2.6)	188 (97.4)	<0.05	35 (18.1)	158 (81.9)	<0.001	193 (100.0)
Female	19 (8.0)	219 (92.0)		92 (38.7)	146 (61.3)		238 (100.0)

*significant at p<0.05 and *Significant at p<0.001

From non-smoker respondents' exposure to second-hand smoke by gender it was found that the proportion was 97.4% in male and 92% in female. Prevalence of second-hand smoke exposure was significantly associated (p<0.05) with gender. From non-smoker respondents' exposure to third-hand smoke by gender it was found that majority of the male (81.9%) and nearly two-third (61.3%) of female non-smoker respondents were exposed to third-hand smoke. And the association between third-hand smoke exposure with gender was highly significant (p<0.001) (Table 3).

DISCUSSION:

Tobacco is the leading preventable cause of death in the world today and a major contributor to the increasing burden of non-communicable diseases.¹ There is no safe level of exposure to tobacco smoke.² In this study it was found that almost all (94.4%) respondents were exposed to second-hand smoke. Findings were much higher than that of GHPSS 2009. Findings were compatible with that of The Global Youth Survey, conducted in 2004 in Armenia which reported 90.1% of never smokers and 96.4% of current smokers were exposed to environmental tobacco smoke (ETS) at their households.¹⁰ In another study, about 74% of the students reported having been exposed to environmental tobacco smoke ETS during the previous week.¹¹ Almost all male and female non-smoker respondents were exposed to second-hand smoke. The proportion was 97.4% in male and 92% in female. Prevalence of second-hand smoke exposure was

significantly associated (p<0.05) with gender of the respondents. In abroad study, about 74% of the students (68% of women, 87% of men) reported having been exposed to environmental tobacco smoke (ETS) during the previous week.¹¹ Among the non-smoker respondents according to their site of second-hand smoke exposure. Indoor places were most common site (25.7%) followed by 24.2% at outdoor places, 23.3% at vehicle, 15.11% at institute, 11.5% at home and 0.2% were exposed at their workplace. The findings were not analogous with GHPSS 2009 findings. According to GHPSS 2009, in Bangladesh among the medical students 47.1% were exposed to second-hand smoke at home, 81.0% were exposed in public places, during the past week and among the dental students 65.1% were exposed to second-hand smoke at home, 75.5% in public places. But one of earlier study presented nearly similar, about 41.0% had been exposed to ETS at home and 69% in other places.¹¹ According to the survey on smoking behaviour conducted by the Taiwanese Bureau of Health Promotion, 46.8% of junior high school students self-reported having SHS exposure at home over the past 7 days.¹² Among the non-smoker respondents, it was found that 70.5% respondents were exposed to third hand smoke and the association between third-hand smoke exposure with gender was highly significant (p<0.001).

CONCLUSION:

From this study it was found that almost all respondents were exposed to second-hand smoke. Almost two-third respondents were exposed to third-hand smoke and this is unsatisfactory. Prevalence of students exposed to SHS and THS exposure were very high. Efforts should be made to plan strategy to promote smoke-free policies to protect non-smokers from SHS and THS exposure.

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DATA AVAILABILITY STATEMENT: The data presented in this study are available on reasonable request from the corresponding author.

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