

# Exposure to Passive Smoke among Residents of a Rural Population in a District of Northern India.

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## ABSTRACT

**Background:** Exposure to environmental tobacco smoke (ETS) is associated with considerable morbidity and mortality associated with non communicable diseases like lung cancers, asthma, respiratory infection etc. Therefore the present study was conducted to study the exposure of passive smoke among residents (non smokers) in a rural population of Barabanki district, Uttar Pradesh. **Methods:** A community based cross-sectional study was conducted among 1346 adults non smokers aged 25 years and above residing in rural areas. Multistage random sampling was done. Equal number of study subjects were enrolled from six randomly selected villages of Satrikh block in Barabanki district. A pre-designed questionnaire was used for collecting data regarding socio-demographic characteristics and passive exposure to tobacco smoke in home and work places. **Results:** About 33.1% of study participants at home and 28.4% at workplaces were exposed passively to tobacco smoke. The association between exposure to passive smoke both at home and workplace was found to be significantly associated with younger age group, other backward caste category, educational status and low socioeconomic status ( $p < 0.05$ ). The exposure at workplace was significantly found to be more among males and those who were laborer/ agriculture worker or shopkeeper by occupation ( $p < 0.05$ ). **Conclusions:** Exposure of passive smoke among adult non-smoker population was found to be quite common both at home and workplaces. This emphasized the importance of need based specific interventions to reduce the risk of exposure and forthcoming smoking related morbidities and mortalities due to passive smoke inhalation.

**Keywords:** Exposure, rural, smoke, tobacco.

## INTRODUCTION

Passive smoking usually refers to the inhalation of smoke that is either exhaled by a smoker or released as side-stream smoke from a burning cigarette.<sup>[1]</sup> The harm caused due to passive inhalation of environmental tobacco smoke (ETS) by non-smokers leads to a substantial proportion of non communicable disease related mortalities and morbidities. Involuntary smoking or second hand smoking is often used synonymously with passive smoking.<sup>[2,3]</sup> About one-third of the global population is exposed to passive smoking supplementing 1% additional burden of diseases like respiratory infections, ischemic heart diseases, lung cancer, and asthma and six lakh premature deaths.<sup>[4,5]</sup> The risk of developing cardiovascular diseases and lung cancer increased

minimally by 25% and 20% respectively among non-smokers.<sup>[6,7]</sup> World Health Organisation (WHO) has been actively involved in curbing the menace associated with tobacco and its product use by implementing the WHO Framework Convention on Tobacco Control (FCTC).<sup>[8]</sup>

Over recent years, Government of India has also implemented a number of strategies to deal with the problem associated with tobacco. Introduction of Cigarette and Other Tobacco Products Act (COTPA) in 2003 addressing non use of tobacco at public places, implementation of rules regarding tobacco advertising and sale and packaging were the significant benchmarks for containment of the problem.<sup>[9]</sup> In 2008, Government of India adopted legislations for complete ban on smoking at public places.<sup>[10]</sup> All these legislations and acts were made in view to decrease the hazards associated with the outcome associated with passive smoking. It is projected that through implementation of these sorts of interventions a substantial exposure of tobacco smoke among non smokers will be reduced. Both the prevalence of active smoking as well as passive

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exposure use to vary from region to region and state to state. Currently there is no specific reliable study in context to exposure of passive smoke among adults at home or workplaces. The present study was therefore conducted to provide a gross overview about the exposure to passive smoke among residents in a rural population of Barabanki district, Uttar Pradesh. Findings from this study will provide the situational analysis of exposure to passive smoke and reflection of grass root level implementation of smoking related rules and acts specifically at workplaces.

## MATERIALS AND METHODS

The present community based cross-sectional study was conducted in Satrikh block of Barabanki district, Uttar Pradesh (catchment of Rural Health Training Centre). A total 1346 non smokers aged 25 years and above were enrolled during the time frame of study between August 2016 to July 2017. Initially a baseline survey was performed in six randomly selected villages (out of 16 villages under RHTC Satrikh) in context to socio-demographic data and smoking habits with the help of accredited social health activist (ASHA) and Anganwadi worker (AWW). Then equal numbers of individuals were enrolled from each village using simple random sampling. Prior to interview the selected individuals were briefed about the study and informed consent was taken. Data was collected by direct face to face interview method using a pre-design questionnaire. It includes basic questions related to socio-demographic details and exposure to passive smoke both at home and workplace. Permissions were obtained from competent authority and the clearance from Institutional Ethics Committee was sought before commencement of study. All data was compiled on Microsoft Excel and statistical analysis was done using Epi Info software. Descriptive statistics were represented using frequencies and percentages while association was assessed between socio-demographic with exposure to passive smoke generating chi-square values.

## RESULTS

The mean age of study participants was  $38 \pm 6.1$  years. Maximum (29.5%) of the study subjects were in age group 35-44 years. About two third of the participants were female. Almost 88.4% of the individuals were married. Majority (58.1%) of them belonged to other backward castes followed by scheduled castes (30.8%) and general category (10.2%). Nearly 53.1% of participants were illiterate. Majority of the study participants were primarily housewives (49.1%) followed by labourers/shopkeepers/agricultural workers (33.8%). Almost one third (34.6%) belonged to lower middle socioeconomic group with almost equal number of participants in middle class and upper groups.

About 33.1% of study participants at home and 28.4% at workplaces were exposed to passive smoke. The exposure at home was maximum among the individuals in age group 25-44 years. However, the exposure at workplaces was found to be maximum in age-group 45-54 years. About 41.5% of the study participants in age group 45-54 years were exposed to smoke at work places, while 39.8% of the elderly (65 years and above) were exposed to passive smoke at home. The association between age and exposure to passive smoke (both at home and work places) was found to be statistically significant.

**Table 1: Association between exposure passive smoke with socio-demographic variables (N=1346).**

Characteristics	Exposure at Home (n=446)	Exposure at Workplaces (n=383)
<b>Age group(in years)</b>		
25-34 (n=471)	150(33.6) [31.8]	105(27.4) [22.3]
35-44 (n= 398)	152(34.1) [38.2]	104(27.2) [26.1]
45-54 (n=272)	77(17.3) [28.3]	113(29.5) [41.5]
55-64 (n=122)	34(7.6) [27.9]	31(8.1) [25.4]
65 and above (n=83)	33(7.4) [ 39.8]	30(7.8) [36.1]
Chi-square, df, p-value	10.9, 4,0.02	35.69, 4, 0.00
<b>Sex</b>		
Male (n=418 )	123(27.6) [29.4]	269(70.2) [64.4]
Female (n=928 )	323(72.4) [34.8]	114(29.8) [12.3]
Chi-square, df, p-value	3.76, 1, 0.05	383.80, 1, 0.00
<b>Marital Status</b>		
Unmarried (n=26 )	22(4.9) [84.6]	8(2.1) [30.8]
Married (n=1190 )	387(86.8) [32.5]	341(89.0) [28.7 ]
Divorced/Separated (n=5 )	1(0.2) [20.0]	1(0.3) [20.0]
Widowed (n= 125 )	36(8.1) [28.8]	33(8.6) [26.4]
Chi-square, df, p-value	32.75,3,0.00	0.527, 3, 0.91
<b>Category</b>		
General (n= 138 )	116(26.0) [84.1]	13(3.4) [9.4]
Other backward castes (OBCs) (n=783 )	232(52.0) [29.6]	262(68.4) [33.5]
Scheduled caste (SC) (n= 415 )	96(21.5) [23.1]	100(26.1) [24.1]
Scheduled tribe (ST) (n=10)	2(0.4) [20.0]	8(2.1) [80.0]
Chi-square, df, p-value	185.3, 3, 0.00	51.12, 3, 0.00
<b>Educational Status</b>		
Illiterate (n=716 )	377(84.5) [52.7]	118(30.8) [16.5]
Literate (n=630 )	69(15.3) [11.0]	265(69.2) [42.1]
Chi-square, df, p-value	263.03, 1, 0.00	107.74, 1, 0.00
<b>Occupation</b>		
Government-employed (n= 42 )	15(3.4) [35.7]	4(1.3) [9.5]

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Non-government employed (n=168 )	60(13.5) [35.7]	22(7.4) [13.1]
Labour/Shopkeeper/Agricultural workers (n= 456 )	145(32.5) [ 31.8 ]	268(90.2) [58.8]
Student (n=14 )	7(1.6) [50.0]	3(1.0) [21.4]
Home-maker (n=661 )	217(48.7) [32.8]	NA
Retired (n= 5 )	2(0.4) [40.0]	NA
Chi-square, df, p-value	2.93,5,0.71	128.83,3,0.00
<b>Socio-economic Status*</b>		
Upper class (n=295 )	81(18.2) [27.5]	102(26.6) [34.6]
Upper Middle class (n=240 )	93(20.9) [38.8]	79(20.6) [32.9]
Middle class (n=229 )	102(22.9) [44.5]	44(11.5) [19.2]
Lower Middle class (n=467 )	142(31.8) [ 30.4 ]	120(31.3) [25.7]
Lower class (n=115 )	28(6.3) [24.3]	38(9.9) [33.0]
Chi-square, df, p-value	26.73, 4, 0.00	20.31, 4, 0.00

[ ]-row percentage

( )-column percentage

\*Modified B G Prasad scale 2017.

Almost 70.2% of the individuals who were exposed to passive smoke at workplaces were male. Exposure at home was higher among females (72.4%). The association between exposure at work places with gender (more among males) was found to be statistically significant. Marital status was also found to be significantly associated with exposure at home. Almost 86.8% of home exposure cases were among subjects who were married. The association between exposure to passive smoke both at home and work place was found to be significantly associated with social category as well as educational status. More than half of the individual exposed to passive smoke belonged to other backward castes. Subjects belonging to general category were more exposed to passive smoke at home. About 84.5% of the individuals who were exposed to passive smoke at home were illiterate while 69.2% of those got exposed to smoke at work places were literate. Significant association was also observed between occupation and exposure to passive smoke at workplaces. Maximum exposure was observed among the laborer/shopkeeper/agricultural worker group. Almost two-third of the exposed group belong to lower middle socioeconomic strata and association between socioeconomic status and exposure to passive smoke was highly significant.

## DISCUSSION

Limited study are present related to exposure to passive tobacco smoke by non smokers specially in India. Those present were mainly focussed on a special group or category like pregnant females, students or under five children. The present study was an attempt to explore a large population residing in rural set up in a state like Uttar Pradesh.

Similar to previous studies high exposure rate was observed in younger age groups (both 25-34 years and 35-45 years).<sup>[11-13]</sup> This could be explained by the fact that being in productive age, this group were more exposed to the passive smoke in their routine outdoor schedule at their work places, while the cause for high exposure in home need to be further explored. Perhaps since most of the participants were female and married, the active smoking by their spouses might be the reason for high exposure at home. This could further be strengthened by the finding as 72.4% of those who were exposed to passive smoke at home were females while 70.2% of those who were exposed to passive smoke at work places were male. Similar findings were also reported in previous studies.<sup>[13,14]</sup> This could further be supported as the highest proportion of individuals exposed to passive smoke were married. Similar findings were also reported by Xiao Gong and his colleagues.<sup>[13]</sup> More than half of the participants exposed to passive smoke belonged to other backward castes. This finding could be correlated with demographic profile and occupation. Still in rural set up of a state like Uttar Pradesh, the backward castes and category are involved in the agricultural works or having small self set up like shops which more over had higher general face to face contacts frequencies than other groups. So both these factors complement each other leading to high prevalence rate. However more than 80% of those belonging to general category were exposed to passive smoke at home, which could be explained stratified analysis of these groups by gender. When analysed in context to educational status, about 84.5% of those exposed to passive smoke at home were illiterate while 69.2% of those who were exposed at work places were literate. Vice versa it could be interpreted from data that half of illiterate were exposed to passive smoke at home while half of literate were exposed to same at work places. This was in accordance to the findings of previous studies.<sup>[13,14]</sup> Also the proportion of individuals exposed to passive smoke both at home and work places belonged to lower middle and below socioeconomic strata. This might be attributed to the nature of occupation, housing characteristics and other baseline variables. Concurrent to the findings of other previous study exposure to passive smoke was found to be significantly associated with socioeconomic status.<sup>[12,13]</sup>

Although the study was primarily not intended to study tobacco use but it provides a reflection regarding the exposure to second hand smoke at home and workplaces in rural areas but the exposure in terms of quantity, amount and duration was not explored in present study. Secondly since only few baseline variables were analysed in relation to exposure to passive smoke, the study findings implicate the need for conduction a study

with more broader approach with analytical approach for understanding its association with the clinical outcomes related to inhalation of passive smoke.

## CONCLUSION

In summary we conclude that exposure to second hand passive smoke was quite common among adult population. The exposure to passive smoke at workplaces was particularly found among males in younger age group more often literates belonging to lower socioeconomic strata. But when visualised in frame of home based exposure, it was predominantly higher among young females preferably married belonging to lower socioeconomic strata. Study finding enlighten the need of specifically oriented interventions (keeping age, gender, socioeconomic status, occupation in context) to be incorporated in routine public health aspect services provided to the population in more comprehensive and effective way.

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