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Secondhand Tobacco Smoke Exposure in Low Income Group Women of Nagpur, India

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Abstract : The constantly increasing tobacco epidemic is considered as the most important risk factor for increasing lung cancer cases in the world in general and South East Asian countries in particular. In countries like India, the smoking rates among women are significantly low but the proportion of cancer patients who never smoked tobacco is also alarming. The high cancer rates in non smoker women are due to secondhand indoor tobacco smoke exposure. This fact has been ignored and appropriate interventions are lacking in this direction. The present study was conducted to determine the second hand smoke exposure among non smoker females of low socioeconomic groups. In this study it was observed that the smoking was predominantly a habit of males (40.4%). It is also noticed that 32.21% of the non smoker females were being exposed to the second hand tobacco smoke due to the indoor smoking of their male counter parts. The present study reveals that a majority (143/153, 93.46%) of the smokers exposed their family members (average 5.37 per smoker) to the hazard of environmental tobacco smoke due to overcrowded houses in slum areas. Till date no other known external carcinogen that has been documented to expose such a huge proportion (32.21%) of female population. Hence it is suggested that the increasing lung cancer cases in non smoker women is due to exposure of secondhand exposure of tobacco and needs the intervention at household level.

Key words : Secondhand tobacco smoke, Women's health, Lung cancer risk, Low Socioeconomic group.

Introduction

Smoking plays a major etiological role in the pathogenesis of lung cancer which is the commonest cause of all cancer deaths claiming 1.3 million lives every year (Doll and Hill, 1950, Hecht, 1999; Lam *et al*., 2004; WHO, 2009). According to WHO (2010), 80% of the world's smokers live In South East and the tobacco-related illness/ death is heaviest in lower and middle-income groups due to lack of adequate health care awareness about the modern health care system. The various studies in these countries have reported overall smoking rates between 21% to 25% but smoking habit is disproportionately higher among males than females. In Bangladesh, the proportion is 42.2% and 1.5% male and female, respectively (Subramanian *et al*., 2004; Flora *et al.*, 2009; Rahman, 2003; Bush *et al*., 2003; WHO, 2003; Rani *et al*., 2003; Pramil *et al*., 2009). Jindal *et al*.(1982) reported that in India 94.4% of the female cancer patients had never smoked. According to a European study, children exposed to second-hand smoke are more likely to develop lung cancer later in life than other kids. The risk was as high as three times in high exposure groups but even exposure once a week also carried significant consequences (Dell, 2005). The association of passive smoking with lung cancer has been supported by multiple institutional studies revealing their odds ratios (Hirayama, 1981; Hackshaw *et al*., 1997; Elisa and Stanton, 2000). This phenomenon is particularly noticed in case of females and children who are the innocent victim of this disease. However, methodological challenges like misclassification of active smoking status, confounding, systematic case-control differences, recall bias, diagnostic bias and publication bias have made it difficult for reviewers to conclude with any certainty that environmental tobacco smoke causes lung cancer (Lee, 1998). Moreover, their findings are confined to the limited set of patients which have access to health care service. Poor health care services cannot explain the risk properly to the low socioeconomic groups of in developing countries. In these settings maximum amount of second hand smoke exposure occurs due to their poorly ventilated, overcrowded homes and this is not amenable to any reporting or legislation (Kraev *et al*., 2009; WHO, 1999). The population based demographic data lacks in its quantity and quality in developing

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courtiers (Elisa and Stanton, 2000; Kraev *et al*., 2009; WHO, 1999).The present study was designed to study the exposure to second hand smoke in non smoker population of poor socioeconomic women belonging to middle and lower class.

Materials and Methods

The study was designed as a cross sectional study at Zone No. 10 of Nagpur Municipal Corporation, Nagpur, Maharashtra India. The study included the class IV workers working in this zone and their spouses. All the workers were first enrolled through their pay registers form the offices. The workers working in this zone were contacted at the time of their evening assembly at their zonal office. They were appraised the purpose of this survey and informed consent was taken. The 27 workers who did not provide consent for participation were excluded. The subjects were accompanied to their home for detailed interview. At their home the husband and wife were separately interviewed. Pilot tested structured questionnaires were used which included questions regarding their personal habits with special emphasis on their own smoking habit, smoking habit of the spouse. The additional demographic environmental data like age, sex, number of family members, socioeconomic status, floor area of the house, etc. were also recorded. The socioeconomic status was determined according to modified Kupuswami Scale. Certain other environmental factors that can append the hazard of environmental tobacco smoke exposure were also studied. These factors included overcrowding in the house, residence in slum area and smoke producing cooking fuel i.e. fuels other than LPG like coke, coal, wood or kerosene.

Definitions

Smoker: A person who smoked at least one cigarette per day for last one year. (Doll and Hill, 1950).

Passive smoker: A non smoker person whose spouse smoked at home or in his/her presence (WHO, 1999).

Overcrowding: As per the standard norms of floor area (Sq. Feet) and number of persons residing (Park, 2005).

Slum area: As per the census list of Nagpur Municipal Corporation. At the end of this study the results were shared with the subjects along with scientific appraisal of the matter. Through small group interactions attempts were made to address their individual problems. Certain favorable observations were appreciated at the hands of their supervisors in order to consolidate these efforts.

Statistics

Required sample size with 25% smoker rate and 20% allowable error was 300. To allow gender wise analysis the study had included 401 males and 444 females. The data were entered in Microsoft Office Excel software for analysis. Statistical tests used to determine the association between two variables included X^2 test. A result was considered significant at a p value < 0.05 and highly significant at p value < 0.001.

Results

Demographics

In this study a total of 845 individual consented for participation (females 444, males 401). These mainly belonged to lower middle (44.02%) and upper lower (28.40%) socioeconomic class according to Modified Kuppuswami Scale. This was an economically productive age group of the society with age ranging 18 to 62 years, mean 39.89 years. (Table 1)

Smoking habit

In this survey a total of 173 subjects (20.47%) smoked tobacco in the form of cigarettes or bidis (hand rolled tobacco product), six males reported to use ganja and charas along with tobacco. Majority (92.64%) of the smokers was male and there was highly significant difference in the gender wise proportion of smokers (males 40.40% and females 2.48%). (Table 2) The mean number of cigarettes/bidis smoked per day by a smoker was 9.30

Table 1: Distribution of mean age according to gender

Sex	N (%)	Mean age (Years)	Std Error	95% CI (Years)
Male	401 (47.46%)	41.21	0.40	40.42 – 42.00
Female	444 (52.54%)	38.69	0.38	37.92 – 39.46
Total	845	39.89	0.28	39.33 – 40.45

Table 2: Distribution of smoking habit according to gender

	Male	Female	Total
Smoking habit	No. (%)	No. (%)	No (%)
Smoker	162 (40.4)	11 (2.48)	173 (20.47)
Non smoker	239 (59.6)	433 (97.52)	672 (79.53)
Total	401 (100)	444 (100)	845 (100)

x^2 = 186.0974; p value < 0.001 (highly significant)

Table 3: Distribution of smokers according to marital status

Marital status	Currently Married **No. (%)**	Unmarried/Widowed/divorced/saperated **No. (%)**
Males	153 (98.08)	9 (52.94)
Females	3 (1.92)	8 (47.06)
Total	156 (100)	17 (100)

x^2 = 52.45093; p value < 0.001 (highly significant)

Table 4: Distribution of passive smokers according to gender

Passive smoker	**Males No. (%)**	**Females No. (%)**
Yes	0 (0.0)	143 (32.21)
No	401 (100)	301 (67.79)
Total	401 (100)	444 (100)

(95% CI 7.68 – 10.92). Each smoker resided with an average 5.37 family members (95% CI 5.11 – 5.63).

Passive smokers

All the currently married smokers (153) were likely to be a source of environmental tobacco smoke to their spouses (Passive smokers, Table 3). However, during the interview, the husbands of ten females and three female smokers admitted that they did not smoke in home or in presence of the family. Therefore, such subjects were excluded from the list of passive smokers. Therefore, a total of 143 (32.21%) females were found to be passive smokers (Table 4). None of the male could fit the definition of passive smoker as all the three married women who smoked did not smoke in presence of their husbands. Even the husband of only one female knew that his wife smokes. From this, it can also be concluded that majority (143/153, 93.46%) of the male smokers exposed their spouses to the passive smoke.

Environmental assessment

A considerable proportion (61.54%) of passive smokers resided in overcrowded houses, mostly located in slum areas (59.44%) where basic sanitary facilities are further hampered. In addition 10.49% of the passive smokers used cooking fuel other than LPG (Table 5).

Discussion

Earlier workers in this field notice that the proportion of smokers is about 20.47% in lower and middle income families in South East Asia (Rahman, 2003; WHO, 2003). It is also generally accepted that males constituted the majority of the smokers in comparison to females. In Bangladesh smoking rate was 42.2% and 1.5% for males and females respectively (Flora *et al*., 2009). Pramil *et al*., 2009 reported that in Cambodia cigarette smoking occurred among 48.0% of men and 3.6% of women. The present study is in

Table 5: Environmental risk factors among passive smokers

Environmental factors	Passive smoker	
	Yes (N = 143) No.(%)	**No (N = 301) No.(%)**
Overcrowding	88 (61.54)	156(51.83)
No Overcrowding	55(38.46)	145(48.17)
Slum area	85(59.44)	155(51.50)
Non slum area	58(40.56)	146(48.50)
Non LPG fuel	15(10.49)	26(8.64)
LPG fuel	128(89.51)	275(91.36)

conformation to the finding of the earlier investigators that male smoke more than the female in India also.

These smokers smoked an average of 9.3 per day. According to the hypothesis generated by Doll *et al*, in 1950, the risk of developing lung cancer (known as Odds Ratio) is 19 times higher in persons smoking 10 cigarettes per day. This does not mean only smokers are at risk of cancer in this population as comparable proportion of non smoker women (32.21%) was also exposed to secondhand smoke. Majority of the male smokers exposed their spouses to the passive smoke. Their other family members particularly children were also at risk because the role of involuntary smoking in causation of disease, including lung cancer has been well documented (Hackshaw *et al*., 1997; Elisa and Stanton, 2000, Kraev *et al*., 2009). Moreover in this particular population, the hazard can appended by the environmental factors like overcrowding, slum areas, and smoke producing cooking fuel. The present investigation suggests that the increasing number of lung cancer cases in non smoker population is due second hand exposure of tobacco in low scocioeconomic populations. These women and children are deprived of their right to the highest attainable standard of health. Their right to grow up in an environment free from tobacco smoke must be safeguarded as they do not choose this exposure. Legislative measures like bans on tobacco advertising, promotion and sponsorship can reduce tobacco consumption. But only 26 countries, representing 8.8% of the world's population, have comprehensive national bans. (WHO, 2010) Moreover these can not protect the women and young children whose greatest exposure to tobacco smoke occurs at home. This problem needs to be addressed through more practical interventions such as, aggressive awareness generation about this aspect of the disease epidemiology so that high grade motivation is developed among the at risk groups. (Kraev *et al*., 2009; WHO, 1999) Smoke free indoor air ordinances are also helpful for smokers as they create an environment that motivates smokers to stop. (Pierce, 1994; Chapman, 1999) Therefore at the end of this study the results were shared with the subjects along with scientific appraisal of the matter. We had small group interactions to address the individual problems. In order to consolidate these efforts the non smoker males as well as those smokers who did not smoke in presence of their family were felicitated and awarded certificates through their supervisors.

Conclusion

Control of house hold tobacco smoke is an integral component of primary prevention of lung cancer. Till date no other known external carcinogen that has been documented to expose such a huge proportion (32.21%) of female population. Moreover clean indoor air ordinances will not only protect non-smokers from second-hand smoke but also create an environment that makes it easier for smokers to stop. The study calls for an urgent need for invention of appropriate interventions in this direction so that World Cancer Day 2010 theme "Cancer can be prevented too" is accomplished.

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