STUDY ON PREVALENCE OF RESPIRATORY DISEASE IN URBAN POPULATION OF BHOPAL CITY

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ABSTRACT:

Chronic respiratory disease occurrence in urban population is creating burden on economic growth and challenges to public health management. This descriptive, prevalence study was designed to gather data on risk factor related association of respiratory diseases occurrence with information on sign, symptoms and treatment modalities. Questionnaire based personal interview was conducted on selected patients with well documented respiratory problem on demographic, biosocial, educational, occupational and economic background. Body weight, height, blood pressure, details of treatment modalities, sign and symptoms were recorded from hospital data. The prevalence rates were presented as percentage and 95% confidence interval estimated and analyzed by person's chi-square test. Age, number of children more than three ($p<0.0001$), family members more than three ($p<0.01$), overcrowding ($p<0.0001$), low socioeconomic class ($p<0.0001$), unhygienic surrounding ($p<0.001$), education below secondary level ($p<0.01$), low to normal BMI ($p<0.002$) and chronic smoking habit ($p<0.001$) showed significant risk factor related association with occurrence of respiratory disease. Most frequently found sign and symptom are apnea, tiredness, nausea, coughing and nose tickling. Marital status, source of drinking water, cooking fuel, occupation, employment status, income, respiratory rate, sleep pattern and regular use of other medication does not show any co-relation with respiratory disease occurrence. The significant risk factor for respiratory disease occurrence is aging, unhygienic environment, low level education, overcrowding and smoking.

Key words: respiratory disease, urban population, sociodemography, education, smoking, age.

INTRODUCTION

Chronic respiratory diseases like asthma and chronic obstructive pulmonary disease (COPD) represent a challenge to the public health in both industrialized and developing countries because of their frequency and economic impact. Nearly 210 million people have chronic obstructive pulmonary disease (COPD) while millions have allergic rhinitis and other often-underdiagnosed chronic respiratory diseases. According to the latest WHO estimates (2007), currently 300 million people have asthma. Nearly 210 million people have COPD while millions have allergic rhinitis and other often-underdiagnosed chronic respiratory diseases.[1] In 1990, the World Health Organization/World Bank Global Burden of Disease study estimated the global prevalence of COPD to be 9.33 per 1000 individuals for men and 7.33 per 1000 for women with higher prevalence in industrialized countries.[2]

In India, there have been only a few population-based studies on the prevalence of COPD,[3-4] some hospital based studies,[5] some in specific population groups like patients attendants.[6] The objective of the survey is to measure respiratory disease occurrence and gathering information in the form of risk factor assessment and treatment modality. Outcome of the study will provide data for planning, organization and evaluation of preventive and curative services regarding respiratory lung diseases.

MATERIALS AND METHODS

Study design

This was a descriptive study based on single examination of hospital registered patients with clinically documented respiratory related disease between Jan 2011 to March 2011. Information regarding the demographic and biosocial characteristics, educational, occupational and economic status of the selected patients was recorded in a predesigned and pretested questionnaire following a personal interview. Body weight, height and blood pressure of the respondents were measured and recorded. The housing condition was considered to be over crowded if either the room standard or area standard is exceeded.[3] Socioeconomic status was scored by Kuppuswamy's socioeconomic status scale on the basis of education, occupation and family income.[7]

Study subjects

Adult urban population of Bhopal city, 18 years and above of both sex (Male/ Female) were selected for the study. The study population was selected by referring the hospital record in five hospitals of Bhopal city. Participation was limited to individuals who were not anemic or on antipsychotic drugs therapy, free from liver or renal dysfunction, arrhythmia or any form of severe cardiovascular disorder. Pregnant or lactating women were also excluded.

Ethical consideration

Written permission from the authority of the respective hospital and verbal consent from the respondents was taken for the study after explaining about the study procedure.

Statistical Analysis

Data was entered in MS Excel and analyzed using the software In-Stat Graph Pad Prism Version. The prevalence rates are given as percentages and 95% confidence intervals were estimated. Discrete data was analyzed using Pearson's Chi-square test for difference in proportions. Two-tailed p-values less than 0.05 were considered significant.

RESULTS

Total fifty patients with respiratory related diseases were interviewed and data collected out of which 64% participants were male and 36% were female, aged above 18 years belonging to urban areas of Bhopal (insert Figure 1 here). Family member more than four and number of children more than three has a significant (p<0.01) correlation with respiratory disease prevalence. Education status of the participants has significant correlation (p<0.01) with occurrence of respiratory disease as 64% of the respondents were having below secondary level education (insert Table 1 here).

Overcrowding showed an extremely significant (p<0.001) association with prevalence of respiratory disease with a relative risk of 2.00. Socio-economic Class IV (Upper lower) has extremely significant risk factor related association with prevalence of respiratory disease (insert Figure 2 here).

Vegetarians showed a significantly (p<0.001) higher chances of respiratory disease development. The respondent with respiratory diseases was mostly having statistically significant low (44%) to normal (48%) BMI. A total of 44% of male respiratory disease patients were smokers making it an extremely significant risk factor and among them 38% participants were chronic long time smokers. 18% of male participants were drinkers with an extremely significant higher risk of having respiratory disease (insert Table 2 here).

Occurrence of tuberculosis was highest (36%) followed by asthma (22%) and chronic obstructive pulmonary disease (14%). The duration of disease was less than 2 years in 52% and more than 5 years duration in 20% of patients. A total of 62% of patients need frequent hospitalization due to respiratory disease related complications (insert Table 3 here).

Patients mostly complaint about apnoea (82%), morning tiredness (66%), sleep apnoea (64%), constant coughing with nausea (58%), nose tickling (50%), sudden weight loss (42%), eye pain (40%), eye inflammation (36%) and sore throat (34%) (insert Figure 3 here). Occurrence of respiratory distress, dyspnea, and chronic cough was

observed in 20%, 18% and 12% of patients respectively (insert Figure 4 here). Common treatment modalities were antacid (60%), antibiotic (56%), anti-tubercular (42%), bronchodilator (42%), antiemetic (34%), antitussive (22%) and multivitamin (20%) in patients (insert Figure 5 here).

Table 1. Respiratory disease prevalence in relation to demographic and bio-social characteristics of the respondents

Demographic and Socio-economic Status		Male (%)	Female (%)	Total (%)
Marital status	Single, never married	20	6	26
	Married	42	24	66
	Separated	2	2	4
	Divorced	2	-	2
	Widowed	2	-	2
	Chi square 4.007 P 0.4051			
Family member	More than 2	6	-	6
	2-4	24	22	46
	5-7	28	8	36
	More than 7	10	2	12
	Chi square 10.997 P 0.0117			
No of children/issues	0	16	12	28
	1	2	4	6
	2	8	12	20
	3	22	6	28
	6	14	2	16
	8	-	16	16
	Chi square 24.912 P 0.0001			
No. of rooms available	1	8	4	12
	2	18	10	28
	3	14	16	30
	4	12	6	18
	5	10	-	10
	5 or more	22	-	22
	Chi square 22.086 P 0.0005			
Residence category	Independent house	22	10	32
	Rented independent House	8	4	12
	Rented shared house	4	10	14
	Multistoried flat	2	2	4
	Mohalla	10	6	16
	Slam	20	-	20
	Old age house	2	-	2

	Chi square 21.191	P 0.0017		
Years of residence in present locality	By birth	58	18	76
	Migrated from village	6	10	16
	Migrated from other city	4	4	8
	Economic condition or unemployment	-	-	
	Transferable job	-	-	
	Any other, specify	-	-	
	Chi square 10.446	P 0.0054		
Surrounding environment	Natural lighting	46	38	84
	Air flow/Ventilation	44	34	78
	Noise (adjacent bus stand/railway line/station)	12	32	44
	Cleanliness (presence of open drainage/toilet/garbage/any other)	38	32	70
	Chi square 11.594	P 0.0089		
Source of drinking water	Municipal	48	18	66
	Bore well	6	10	16
	Tube well	4	2	6
	Other	10	2	12
	Chi square 8.474	P 0.0372		
Availability of toilet facility	Community	2	2	4
	Individual	56	28	84
	Open field	10	2	12
	Chi square 1.961	P 0.3752		
Cooking fuel combustion	LPG gas	36	22	58
	Kerosene	26	8	34
	Wood	14	6	20
	Coal	4	-	4
	Other	16	14	30
	Chi square 6.382	P 0.1723		
Highest education level	University or college or equivalent	10	2	12
	Secondary school	10	12	22
	Primary school only (or less)	20	8	28
	Insufficient data	28	10	38
	Chi square 7.151	P 0.0542		

Table 2. Respiratory diseases prevalence in relation to life style related risk factors

| Risk Factors		Male (%)	Female (%)	Total (%)
Type of diet	Vegetarian	36	30	66
	Non- vegetarian	32	2	34
	Chi square 16.149	P 0.0001		
Basal Metabolic Index (BMI)	Low (<18.5)	22	22	44
	Normal (18.5-24.99)	40	8	48
	High (≥ 25.00)	6	2	8
	Chi square 11.918	P 0.0026		
Sleep pattern	Satisfied	48	20	68
	Non-satisfied	20	12	32
	Chi square 0.6542	P 0.4186		
Respiratory rate	Low (<12)	32	12	44
	Normal (12-20)	30	16	46
	High (>20)	6	4	10
	Chi square 0.9097	P 0.6346		
Blood pressure	Hypotensive	26	2	28
	Hypertensive	12	2	14
	Normal	30	28	58
	Chi square 17.030	P 0.0002		
Diabetes	Yes	4	-	4
	No	64	32	96
	Chi square 1.961	P 0.1614		
Smoking habit	Smoker	44	-	44
	Non-smoker	6	24	30
	Ex-smoker	4	-	4
	Passive smoker	14	8	22
	Chi square 54.545	P < 0.0001		
Type of smoking consumption	Biddi	34	-	34
	Cigarette	10	-	10
	Biddy+ Cigarette	14	-	14
	Cannabis (Ganza)	-	-	-
Chronic/longtime smokers	< 5 Years	6	-	6
	> 5 Years	38	-	38
Alcohol consumption	Drinker	18	-	18
	Non-drinker	50	32	82

	Ex-drinker	-	-	-
	Chi square 10.330	P 0.0013		
Use of regular nebulizer	Yes	16	8	24
	No	52	24	76
	Chi square 0.0258	P 0.8724		
Use of regular medication	Yes	14	8	22
	No	54	24	78
	Chi square 0.2486	P 0.6193		

Table 3. Clinical categorization of the respiratory disease prevalent among the respondent

	Disease characteristics	No. of Male	No. of Female	Total (%)
Disease category	COPD	5	2	14
	Bronchogenic carcinoma	1	-	2
	Cerebral metastasis	1	-	2
	Pneumonia	3	2	10
	Tuberculosis	13	5	36
	Bronchitis	2	3	10
	Plural infusion	-	1	2
	Asthma	8	3	22
	Hemoptysis	1	-	2
	Chi square 5.784	P 0.6715		
Frequent health problem	Chest Pain	14	4	36
	Dyspnea	4	10	28
	Cough	4	12	32
	Chi square 11.876	P 0.0026		
Disease chronicity	> 1 year	14	12	52
	> 2 year	7	2	18
	2-5 year	2	3	10
	> 5 year	5	5	20
	Chi square 2.447	P 0.4850		
Frequent hospitalization	Yes	19	12	62
	No	12	7	38
Other chronic disease	Epilepsy	3	2	10
	Cancer	2	-	4
	Hypothyroidism	1	1	4

Angina	2	-	4
Congestive heart disease	2	1	6
Pancreatitis	1	-	2
Peptic ulcer	1	-	2
Malaria	4	1	10
Diarrhea	2	-	4
Chi square 3.378		P 0.7602	

Figure 1. Respiratory disease prevalence in relation to age and sex distribution of the respondents in percent.
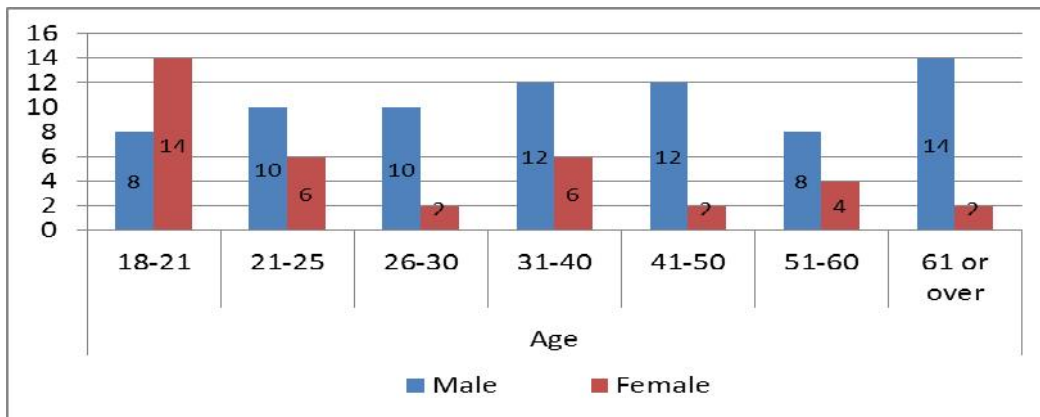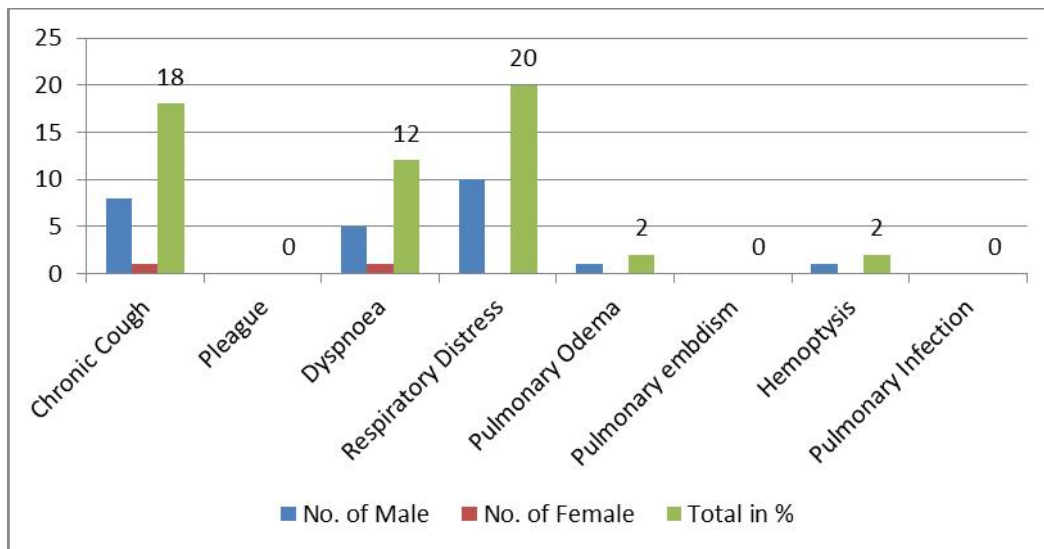

Figure 2. Respiratory disease prevalence in relation to different socio-economic status of the respondents in percent.
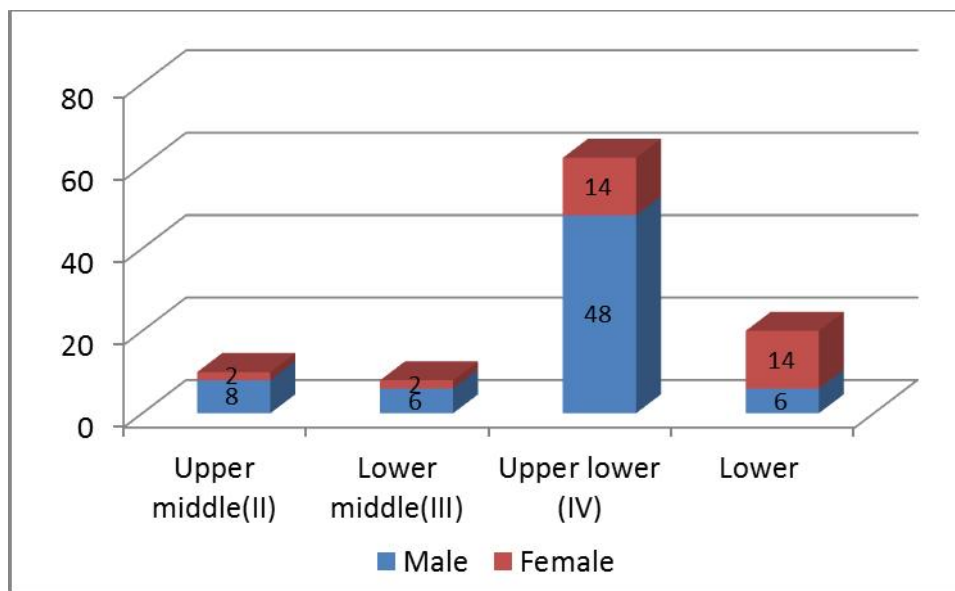
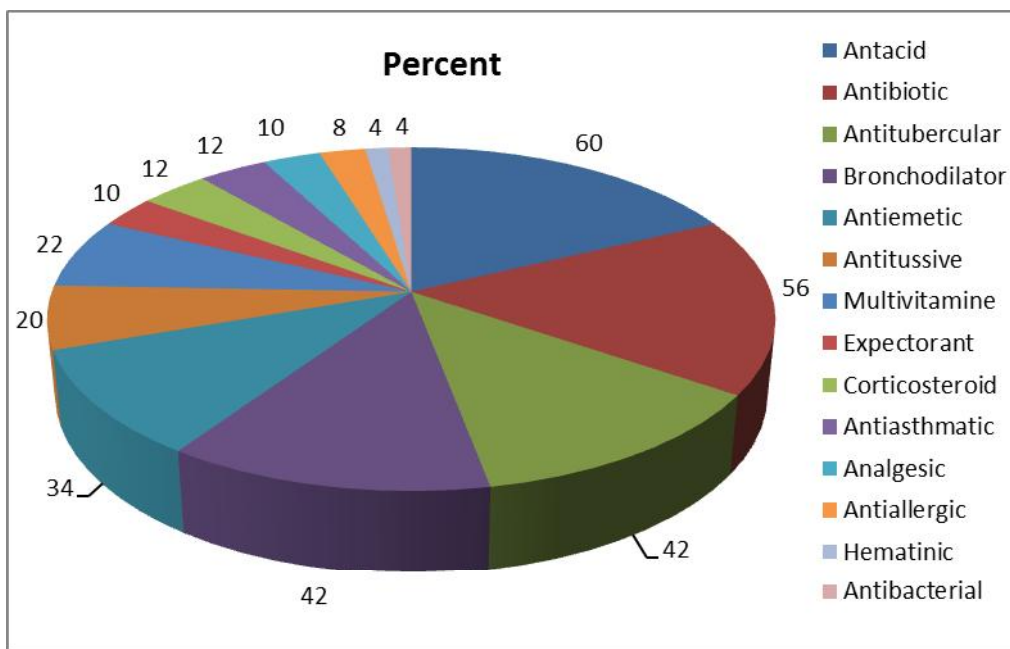**Figure 3.** Association of respiratory disease with occurrence rate of general sign and symptom.
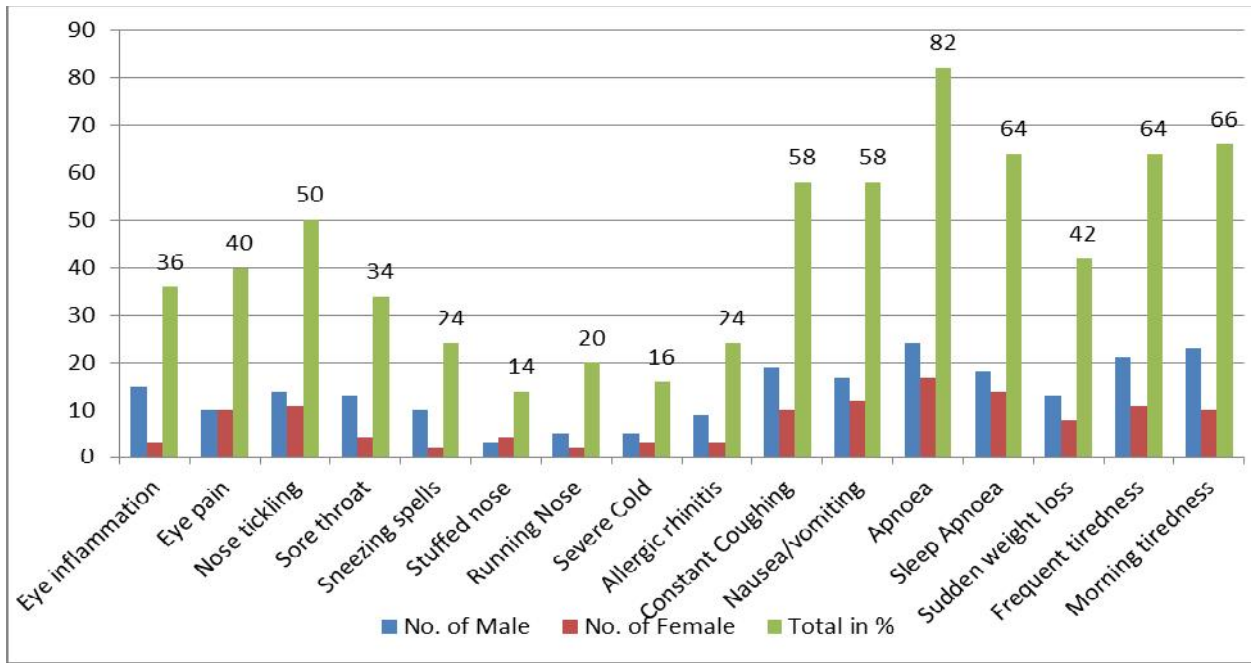
Figure 4. Association of respiratory disease with occurrence rate of clinical sign and symptom.

Figure 5. Category wise drug treatment modality in respiratory disease patients.

DISCUSSION

Lower respiratory tract infections, COPD, tuberculosis and lung cancer are each among the leading 10 causes of death worldwide. Demographic changes in the developing world along with health care systems, schooling and income the burden of communicable diseases is likely to lessen while the burden of chronic respiratory diseases including asthma, COPD and lung cancer will worsen because of tobacco use and population ageing.[8] The data outcome of the present study showed increased risk of respiratory disease with in aged male participants. Some studies have observed an increase in respiratory diseases with increasing age.[3] Vegetarian diet and low BMI also came out as significant risk factor associated with prevalence of respiratory disease. Some common vegetables like radish, lady's finger, lemon, moong dhal, peanuts, spinach, bananas, grapes, pomegranates, berries and custard apple can act as allergen causing allergic cough and cold.[9]

Smoking is identified as a major factor for respiratory disease not only in the elderly males but also the young adults.[10-11] Out of 44% of males smokers, 38% were chronic smokers signifying smoking as an extremely significant risk factor. This study showed a significantly higher (14%) risk of respiratory disease in young nonsmoker women (18-21 years) may be due to low socio-economic status and exposure to combustion of solid fuels. Most studies from India and other countries have observed a male preponderance for the occurrence of COPD. This survey showed prevalence of COPD 10% in male and 4% in female. The difference is attributed to the differential rates of smoking and occupational exposure between the two genders. Low socio-economic status was an important factor in several epidemiological studies.[12] The proportion of smokers in this study population was higher and a majority of the subjects were from unskilled labors engaged in heavy physical work. In a review on population studies by Jindal et al. (2001),[13] a median figure of 5% for males and 2.7% for females has been estimated. This survey reported a higher prevalence than those mentioned above since the participants of this study mostly belonged to the upper-lower and lower socioeconomic status. However, a community-based study in the rural area of Kashmir reported a considerably higher prevalence attributable to domestic air pollution, lower socioeconomic status, poor housing facilities and overcrowding.[3]

The current study population of urban Bhopal city showed highest prevalence of tuberculosis (36%) among other diseases may be due to more respondents from slam with overcrowded housing, and increased exposure to smoking and alcohol.[14] In the study population lung cancer patients were 4%. About 9% of the disease burden of lung cancer has been attributed to occupation, about 5% to outdoor air pollution,[15] and 1% to exposure to indoor smoke from solid fuels. In an urban area of Kashmir, a prevalence of 5.7% for chronic bronchitis was reported, [16] while in a south Indian village, a prevalence of 3.3% was reported for chronic bronchitis.[17] Bronchitis, pneumonia and plural infusion are common outcome of respiratory tract infection with 22% occurrence rate in this study collectively in male and female both. Indoor smoke from solid fuels,[18] and environmental tobacco smokes are also significant triggers for asthma symptoms and attacks.

Globally, more than 1.5 million deaths occur annually from respiratory infections, attributable to the environment. Unclean environment with presence of toilet, open drainage or garbage was found positive for 70% of respondent signifying a risk factor related correlation with unhygienic environment. Educational status was significantly associated with the occurrence of respiratory symptoms. A study from South Africa reported higher education as a protective factor for respiratory symptoms.[19] The significant association between respiratory symptoms and educational status in this study may be due to the fact that a majority (88%) of the subjects is from upper-lower and lower socioeconomic class with less than secondary level education. This descriptive study provides a valuable summary about the burden of respiratory symptoms in the urban community of Bhopal city. However, this study failed to provide any evidence to distinguish between the cause and effect as it is based on the symptoms of respiratory disease alone and biochemical investigations were not carried out. The present study showed that the significant risk factors associated with prevalence of respiratory symptoms are aging, unhygienic environment, educational status, overcrowding and smoking.

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