ORIGINAL ARTICLE

Risk Factors For Chronic Respiratory Diseases Among Rural Adults in Northwest India

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Abstract

Chronic respiratory diseases(CRD) remain a formidable challenge for public health experts across the world due to their ever increasing morbidity and mortality. This study investigated various risk factors for CRD among rural adults aged 20 years and above. The study was conducted in four villages under sub-health centre Domana in Kot Balwal health block and these villages were selected randomly. For this cross-sectional population based study, a pre-tested respiratory health questionnaire was used. Those respondents who were found to be diagnosed cases of CRD were further enquired in detail about various risk factors for CRD. Out of 2018 respondents surveyed,177 confirmed cases of CRD were detected.Various risk factors like being male, smoking, overcrowding, recurrent chest infections and use of non-clean fuel (wood, cow dung) were found to be statistically significant. Among other risk factors, ventilation and history of allergy were found to be highly significant statistically ($p < 0.000$). Smoking, recurrent chest infections, use of biomass fuel, ventilation and history of allergy were risk factors for CRD in rural adults aged 20 years and above.

Key Words

Chronic Respiratory Diseases(CRD), Rural Adults, Risk Factors.

Introduction

Chronic respiratory diseases (CRD) are defined as chronic disorders of respiratory tract and other structures of the lung. Chronic obstructive pulmonary disease (COPD), asthma and chronic bronchitis are among the most common chronic respiratory diseases.

Due to socio-economic development, urbanization, industrialization, demographic transition and changing lifestyles, all of them have led the developing nations to a stage where they are facing an ever increasing burden of Non-communicable diseases (NCD's)(1).Haphazard urbanization leads to discrepancy between provisions of basic civic amenities by infrastructure and demands of population. As per 2005 estimates in India, NCD's accounted for 53% of all deaths and 44% of disability-adjusted life years (DALYs) were lost. Out of this, chronic respiratory diseases accounted for 7% deaths and 3% of DALYs lost.(2) As per estimates , there are 65 million cases of CRD in India ,out of which asthma and COPD account for over 42 million cases, and this number is projected to grow by 20% by the year 2030(3).

Chronic respiratory diseases are recognized as among the major causes for premature deaths in adult population all over the world. Burden of CRD has major adverse effects on the quality of life and disability of affected individuals. It has been predicted that global burden of CRD will show an upward trend in future, even though many preventable CRD can be controlled with adequate management in both developed(4) and developing countries(5,6) as well as among the deprived

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populations(7,8,9). Lack of awareness of the disease, its symptoms or implications contribute significantly in preventing people at risk from seeking help from their physicians or eliminating risk factors. Further level of under-diagnosis and under treatment is quite high(9). Spirometers aren't routine and diagnosis is largely symptoms based.

Global alliance against CRD (GARD) aims to develop a standard way of obtaining relevant data on CRD and risk factors, encourage countries to implement CRD prevention policies and to make recommend actions of simple and affordable strategies for CRD management.

During the review of literature, there was paucity of studies on risk factors leading to the development of CRD. It was in this context, that the present study was designed to identify the various risk factors for CRD in adults aged 20 years and above in a rural area of Jammu district.

Material and Methods

This cross-sectional study was conducted in Kot-Bhalwal block of Jammu district which was an erstwhile field practice area of Department of Community Medicine, Government Medical College, Jammu. The study was conducted from Jan 2011 to Oct 2011. An ethical clearance was duly sought from IEC, GMC Jammu before the start of the study.

Two-step simple random sampling procedure was used for estimation of sample size. In the first step, SHC(sub health centre) Domana was selected out of all the SHC'c in the block. In the second step, four villages out of six were selected for the conduct of the study. The study population comprised of all the people aged 20 years and above in these four selected villages.

The authors designed a respiratory health questionnaire to identify the patients suffering from CRD. Information was also sought regarding age, gender, socio-economic status, literacy and other risk factors like smoking, overcrowding, history of recurrent chest infections, fuel used for cooking, type of housing, site of kitchen, ventilation, history of allergy, pets and live stock at home etc. This questionnaire was pilot tested in a sample of 50 patients attending the OPD of general medicine in Govt. Medical College, Jammu. The necessary amendments were made before it was used in the field practice area. A house to house survey was conducted to interview all the adults aged 20 years and above. Informed verbal consent was taken from all the respondents before the conduct of the interview. Those who refused to give informed verbal consent were excluded from the study.

Those houses which were found locked during the first visit were paid a second visit the next day. The houses which were found locked even on second visit were excluded from the purview of the study. During the conduct of the survey, 2018 adults aged 20 years and above were registered.

Out of these 2018 cases, we found 177 confirmed cases of chronic respiratory diseases.The respiratory health questionnaire helped to identify the suspects of CRD and a confirmed case of CRD was a patient who had been previously diagnosed by a physician and was on medication for the same.

The data thus collected was analysed using chi-square test to know the statistical significance ($p<0.05$) between various risk factors and chronic respiratory diseases.

Results

There were 1070 males (53.02%) and 948 females (46.98%) comprising a total of 2018 respondents in the study population. Age and sex wise distribution reveals that as we go into higher age groups, the proportion of people shows a decline in both the sexes. The proportion was 28-30% in 20-29 year age group while it was only 5-6% in 70 years and above. 98.41% of the respondents were Hindus. Regarding occupation, 29.40% males were engaged in business while 24.48% of them belonged to service class. Among females, majority (87.76%) were housewives. Literacy status of the study population revealed that 30.90% of the females were illiterates in comparison to 8.31% males. More graduates and above (21.86%) were among the males while females had 16.87% respondents with graduate and above qualification. Out of 368 smokers found in the study population, 92.93% (342/368) were males. Among

the male smokers, 91.22% were current smokers. (*Table 1.*)

Table1. Socio-demographics of the Study Population

Gender	**Male**	**%age**	**Female**	**%age**
	1070	53.02	948	46.98
Religion				
Hindu	1052	98.31	934	98,52
Muslim	10	0.93	10	1.05
Sikh	08	0.74	04	0.42
Occupation				
Service	262	24.48	38	04
Business	320	29.90	15	1.58
Farmer	159	14.85	63	6.64
Labourer	73	6.82	-	-
Others	256	23.92	-	-
Housewives	-	-	832	87.76
Literacy				
Illiterate	89	8.31	293	30.90
Upto Middle	376	35.13	276	29.11
Matric	371	34.67	219	23.10
Graduate & above	234	21.86	160	16.87
Socioeconomic status				
Higher middle	110	10.28	86	9.07
Middle middle	356	33.27	308	32.48
Lower middle	332	31.02	290	30.59
Lower class	272	25.42	264	27.84
Smokers				
Present smokers	312	26		
Ex-smokers	30			

Though majority (123/177) of the patients belonged to lower middle and lower class as far as socio-economic status was concerned, no statistical association was found (*Table 2*). When relationship of smoking as a risk factor for CRD between genders was seen, it was found to be statistically significant in chronic bronchitis and COPD($p<0.000$). Overcrowding as a risk factor was statistically significant for bronchial asthma while recurrent chest infections were highly significant statistically for all three types of CRD. Similarly when fuel usage was analysed, it was found that very few people were using LPG which is a cleaner fuel. A strong statistical significant association was found between type of fuel used and chronic bronchitis and COPD($p<0.000$) (*Table 3*). Type of housing was found to be statistically significant

Table2. Relationship of Socio-economic status with types of CRD

Social class	Chronic Bronchitis	Bronchial Asthma	COPD	Total
Upper Middle	03	04	08	15
Middle Middle	15	08	16	39
Lower Middle	22	08	28	58
Lower Class	28	04	33	65

Chi-square=8.206 df=6 p=0.2234

with COPD while it was found to be non-significant in case of chronic bronchitis and bronchial asthma(p>0.05). Again site of kitchen was also found to have no significant relationship with any of CRD.

Ventilation as a risk factor was found to be statistically significant with all the three types of CRD. Similarly history of allergy, either nasal or skin, was found to be highly significant statistically(p<0.05). Regarding presence of domestic animals, it was found that a statistical significant association existed with COPD(*Table 4*).

Table 3. Association between risk factors and CRD

Risk factors	Population studied		
Smoking	**Chronic Bronchitis**	**Bronchial Asthma**	**COPD**
Smokers	59	06	73
Non-Smoker	09	18	12
Total	68	24	85
P value	0.0000	0.1973	0.0000
Over-Crowding	**Chronic Bronchitis**	**Bronchial Asthma**	**COPD**
Present	20	12	21
Absent	48	12	64
Total	68	24	85
P value	0.2171	0.0043	0.7071
Recurrent Chest Infection	**Chronic Bronchitis**	**Bronchial Asthma**	**COPD**
Present	08	06	13
Absent	60	18	72
Total	68	24	85
P value	0.0136	0.0005	0.0000
Type of Fuel used	**Chronic Bronchitis**	**Bronchial Asthma**	**COPD**
Firewood, Cow Dung, K-Oil/LPG	62	18	76
LPG only	06	06	09
Total	68	24	85
P value	0.0000	0.6201	0.0000

Table 4. Association of other risk factors with CRD

Risk factors	Population studied		
Type of Housing	**Chronic Bronchitis**	**Bronchial Asthma**	**COPD**
Kucha Pukka	20	10	33
Pukka	48	14	52
Total	68	24	85
P value	0.4587	0.0429	0.0030
Site of Kitchen	**Chronic Bronchitis**	**Bronchial Asthma**	**COPD**
Separate	62	22	78
Non-Separate	06	02	07
Total	68	24	85
P value	0.6577	0.6768	0.4351
Ventilation	**Chronic Bronchitis**	**Bronchial Asthma**	**COPD**
Poor	22	08	29
Good	46	16	56
Total	68	24	85
P value	0.0000	0.0411	0.0000
H/O Allergy (Nasal/Skin)	**Chronic Bronchitis**	**Bronchial Asthma**	**COPD**
Present	16	18	11
Absent	52	06	74
Total	68	24	85
P value	0.0000	0.0000	0.0000
Presence of Domestic animals	**Chronic Bronchitis**	**Bronchial Asthma**	**COPD**
Present	43	16	64
Absent	25	08	21
Total	68	24	85
P value	0.6577	0.9394	0.0542

Discussion

In the current study, a higher number of males were found to be suffering from CRD viz. 70.05% of males vs. 29.94% of the females. So being male was found to be an important risk factor for chronic respiratory diseases. These results were consistent with those reported by Lee SJ *et al* (10), Zhou Y *et al* (11) and Celli BR *et al* (12). According to comparative risk assessment project of WHO, occupational factors were responsible for 13% of COPD development (13). Considering that more males tend to be exposed to occupational dust than females (14), male dominance in chronic respiratory diseases may be partially explained. In contrast, Brashier B *et al* (15) reported female gender as a significant risk factor for asthma.

36.72% (65/177) of CRD cases in the current study belonged to lower social class. Though socio-economic status was not significant statistically in our results but Lee SJ et al(10) reported a relationship between low socio economic status and COPD. This linkage may be due to exposure of biomass fuel such as wood. Use of biomass fuel is usually associated with low socioeconomic status (16) and indoor exposure to smoke from such burning has been reported to be an important risk factor of chronic respiratory diseases (17,18). The epidemiology of chronic respiratory diseases has consistently identified low socioeconomic status to be an important surrogate marker of the disease in the world communities.

Smoking as a risk factor was significantly associated with chronic bronchitis and COPD. The major effects of smoking on chronic respiratory diseases have been extensively recorded over more than 40 years (19). Chuchalin AG *et al* (20) also reported smoking as a major risk factor in 12 regions of the Russian Federation. Current evidence suggests that male gender is a potential risk factor for chronic respiratory diseases due to high prevalence of smoking among males. (21,22).

Recurrent chest infections were significantly associated with chronic respiratory diseases. Hinshaw *et al* (23) have equally emphasised the important role played by childhood and recurrent chest infections in chronic respiratory diseases.

88.13% (156/177) of chronic respiratory diseases cases were using either firewood/cow-dung or kerosene oil as fuel in their kitchens and it was found to be a significant risk factor. Chuchalin AG *et al* (20) also reported that biomass exposure had a positive association with chronic bronchitis and bronchial asthma and was statistically significant ($p<0.001$).

More number of chronic respiratory diseases cases were found in people living in kuchha houses. This could be best explained due to excess dust coupled with poor ventilation and low socio-economic status. Due to poverty in these people, nutritional status might modulate the immune response to respiratory infection and might be an effect modifier for relationship between kuccha houses and chronic respiratory diseases. But in contrast to our results, Brashier B *et al* (15) reported no association with fuel for cooking and type of house with symptoms of asthma and chronic bronchitis.

Site of kitchen and presence of domestic animals was found to be not statistically significant though Kurata *et al* (24) reported that daily exposure to cats/dogs account for more of the symptoms of asthma in patients than daily exposure to air pollutants. Consistent with our results, Brashier B *et al* (15) reported no association of separate kitchen, live stock at home with symptoms of asthma and chronic bronchitis.In Indian set up, family members are usually not so intimate with their pets in comparison to their western counterparts. Nasal allergy usually precedes bronchial asthma. 25.42% (45/177) of the respondents had positive history of allergy which concurs with other studies (25, 26).

Limitations

A major limitation of the present study was the inclusion of only diagnosed cases of chronic respiratory diseases which may not be the true representative as there may be more cases that were not diagnosed. Also since the study was conducted only in four villages and in a small geographical area, the findings may lack generalization.

Conclusion

This cross-sectional study has provided valuable

information about role of various risk factors in CRD. Being male as gender, smoking, recurrent chest infections, use of unclean fuels, kucha housing, poor ventilation etc. were found to be important risk factors in CRD. Since illiteracy is still a bane of rural population ,there is need for posters and videos as educative material for community awareness in rural areas.

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