International Journal of Research in Medical Sciences
Thritia S et al. Int J Res Med Sci. 2023 Mar;11(3):941-946
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20230577

Original Research Article

Prevalence of obstructive airway disease in pulmonary function tests of patients visiting respiratory medicine out patient department

Thritia S.*, Hafiz Deshmukh, Ashish Deshmukh, Sunil Jadhav, Shivprasad Kasat, Arya Roy, S. Thamil Mani

Department of Respiratory Medicine, MGM Medical College and Hospital, Aurangabad, Maharashtra, India

Received: 20 January 2023
Revised: 13 February 2023
Accepted: 17 February 2023

***Correspondence:**
Dr. Thritia S.,
E-mail: thritia@gmail.com

ABSTRACT

Background: The recognition of obstructive airway disease as a public health problem, however, has failed to keep pace with its increasing impact on health-care resources. This study is conducted to evaluate the prevalence of obstructive airway disease in pulmonary function tests (PFT) of patients visiting respiratory medicine out patient department (OPD).
Methods: This is a retrospective study of patients from October 2020 to September 2022 (2 years), on 80 subjects reporting to respiratory medicine OPD**,** MGM medical college, Aurangabad. Data collected from 80 subjects who were diagnosed with obstructive airway disease in PFT.
Results: The study population had a COPD prevalence of 16 (19.7%). GOLD criterion revealed that 54.2% (9/16) of COPD patients had mild COPD. This research showed no evidence of very severe COPD. In terms of gender distribution, 8 (16.6%) of 46 males and 7 (19.5%) of 34 women had COPD. However, there was no statistically significant (p=0.167) difference in COPD prevalence between sexes. Furthermore, univariable analysis revealed no significant differences in marital status (p=0.836), co-morbidities (p=0.541), family size (p=0.535), educational status (p=0.827), employment status (p=0.643), and medical visits (p=0.366) between persons with and without COPD.
Conclusions: According to the findings of this research, the variables that increase a person's likelihood of developing COPD are as follows: advancing age, prolonged exposure to smoke from biomass burning, tobacco use, and inadequate ventilation in the kitchen.

Keywords: Obstructive airway disease, Prevalence, PFT, Respiratory medicine, COPD

INTRODUCTION

Obstructive airway diseases, which include chronic bronchitis, emphysema, and asthma, are the fourth leading cause of death in the United States and constitute the only common cause of death that is increasing in prevalence.[1] Among other diseases, the total public health burden of obstructive airway diseases is expected to rank fifth by 2020.[2] The recognition of obstructive airway disease as a public health problem, however, has failed to keep pace with its increasing impact on health-care resources.[3]

The diagnosis of chronic obstructive pulmonary disease is confirmed by spirometry, a test that measures breathing. Spirometry measures the FEV_1, which is the greatest volume of air that can be breathed out in the first second of a large breath. Spirometry also measures the FVC, which is the greatest volume of air that can be breathed out in a whole large breath. Normally at least

70% of the FVC comes out in the first second (i.e., the FEV_1/FVC ratio is >70%). In chronic obstructive pulmonary disease, this ratio is less than normal (i.e., FEV_1/FVC ratio is <70%) even after a bronchodilator medication has been given. Pulmonary function tests were performed with a spirometry on a turbine-based spirometer (MIR spirolab-II) according to American thoracic society (ATS)/ European respiratory society (ERS) guidelines. FEV_1/FVC <70% was used to make a diagnosis of OAD. The tests were performed with the subject in a sitting position and with nose clips in place. Each subject performed at least five spirometric tests (with at least three reproducible and acceptable maneuvers). Reproducibility was considered as present when the second highest values of FEV_1 and FVC were within 5% of the highest values. The highest measured value of FEV_1 and the corresponding measured value of FVC were coded for computer analysis.[4] We defined spirometrically determined categories of airflow as follows: normal (FEV_1 and FVC above 80% predicted: FEV_1/FVC ratio above 0.7); mild airflow obstruction (FEV_1/FVC ratio <70% predicted; FEV_1 80% predicted); or airway obstruction (FEV_1/FVC ratio <70% predicted; FEV_1 <80% predicted) according to the global initiative for chronic obstructive.[4-6]

This study is conducted to evaluate the prevalence of obstructive airway disease in PFT of patients visiting respiratory medicine OPD

Aims and objectives

Aim and objectives were to evaluate the prevalence of obstructive airway disease in PFT of patients visiting respiratory medicine OPD.

METHODS

The study was conducted to evaluate the prevalence of obstructive airway disease in pulmonary function tests of patients visiting the respiratory medicine out patient department (OPD) at MGM medical college, Aurangabad. The study design was retrospective and was conducted over a period of 2 years, from October 2020 to September 2022.

The study population comprised patients reporting to the respiratory medicine out patient department. The sample size was 80 subjects who were diagnosed with obstructive airway disease in PFT.

The inclusion criteria for the study were patients diagnosed with obstructive airway disease in pulmonary function tests. The exclusion criteria included patients unable to perform spirometry correctly, as well as patients with a recent history of myocardial infarction, pulmonary embolism, pneumothorax, recent eye surgery, or recent surgery of the thorax or abdomen.

Data was collected from the patients who met the inclusion criteria and analyzed to determine the prevalence of obstructive airway disease. The variables that were evaluated included gender, marital status, co-morbidities, family size, educational status, employment status, and medical visits.

The data was recorded on anonymous collection sheets (to ensure the confidentiality of the results). The data was entered in excel and statistical analyzes were carried out with SPSS 16 version (Statistical package for social sciences). The completed questionnaires were well checked before the data was entered manually by us. A second check was done by an independent individual to avoid any error. The results were presented as tables, figures and expressed as a percentage or in numbers.

Inclusion criteria and Exclusion criteria

Inclusion criteria

Patients diagnosed to have obstructive airway disease in pulmonary function test were included in the study.

Exclusion criteria

Patients unable to perform spirometry correctly. Patients with recent history of myocardial infarction, pulmonary embolism, pneumothorax, recent eye surgery, recent surgery of thorax or abdomen were excluded from the study.

RESULTS

Socio-demographic characteristics

This research included 80 persons (46 men and 34 women) who were subjected to spirometry. The participants' mean (SD) age was 39.15 (9.36) years, with a range of 30-75 years. The bulk of participants, 427 (58.2%) and 337 (45.9%), were farmers and illiterates, respectively (Table 1).

Behavioural and clinical characteristics

Thirty-one (39%) of the 80 participants included were either previous or current smokers. Former smokers comprised 6 (18.6%) of all smokers and 4 (4.7%) of all current smokers. Biomass smoke was inhaled by 82% (66/80) of the participants (75.3% of men and 91.1% of women). Females were substantially more exposed to biomass smoke than males (p=0.001). Dried wood was the primary fuel used for cooking and heating by 90.3% (72/80) of all participants. Furthermore, the findings indicated that cough was the primary respiratory symptom in 16 (20.4%) of the patients (Table 2).

We found no significant differences between men and women with regards to respiratory symptoms (all p>0.05) (Figure 1).

COPD prevalence and risk factors

Spirometry was performed on a total of 80 subjects. The study population had a chronic obstructive pulmonary disease prevalence of 16 (19.7%). GOLD criterion revealed that 54.2% (9/16) of chronic obstructive pulmonary disease patients had mild chronic obstructive pulmonary disease. This research showed no evidence of very severe chronic obstructive pulmonary disease. In terms of gender distribution, 8 (16.6%) of 46 males and 7 (19.5%) of 34 women had chronic obstructive pulmonary disease. However, there was no statistically significant (p=0.167) difference in chronic obstructive pulmonary disease prevalence between sexes. Furthermore, univariable analysis revealed no significant differences in marital status (p=0.836), co-morbidities (p=0.541), family size (p=0.535), educational status (p=0.827), employment status (p=0.643), and medical visits (p=0.366) between persons with and without chronic obstructive pulmonary disease.

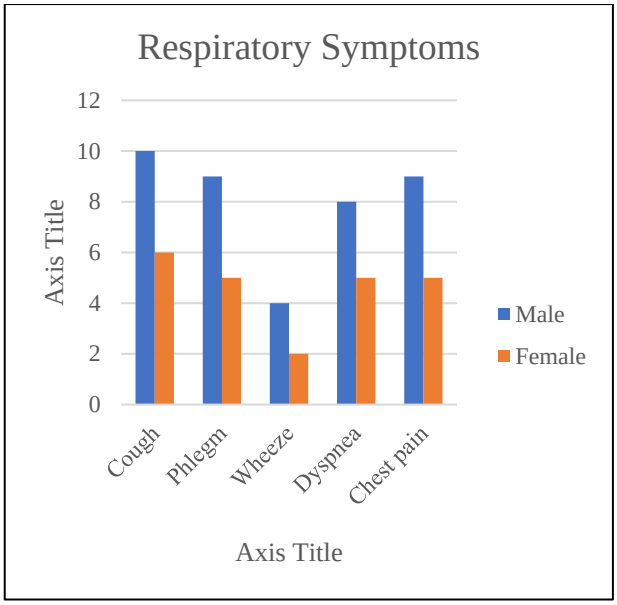

Figure 1: Distribution of respiratory symptoms.

Table 1: Sociodemographic characteristics.

Variables	N	Percentages (%)
Sex		
Male	46	57.4
Female	34	42.6
Age (Years)		
30-39	45	56.5
40-49	22	27.7
50–59	10	11.9
≥ 60	3	3.9
Marital status		
Single	10	12.7
Married	65	80.7
Divorced	2	2.7
Widow/ widower	3	3.9
Religion		
Muslim	29	36
Hindu	43	53.9
Christian	7	8.9
Others	1	1.2
Educational status		
Illiterate	37	45.9
Primary school	24	30.5
High school	11	13.4
Certificate and above	8	10.2
Occupational status		
Farmer	47	58.2
Employed	25	30.9
Housewife	7	8.3
Others	2	2.6
Body mass index (kg/m^2)		
<18.5	12	15.5
18.5-24.9	56	70.3
≥ 25	11	14.2

Table 2: Behavioural and clinical characteristics.

Variables	N	Percentages (%)
Smoking status		
Never smoker	71	88.3
Former smoker	2	2.7
Current smoker	7	9
Years smoked	7	9.28
Cigars smoked per day	3	4.21
Biomass fuel exposure		
No	14	18
Yes	66	82
Fuels used		
Dried Wood	72	90.3
Charcoal	40	50
Animal dung	10	12.8
Electricity	18	23
Kerosene gas	2	2.2
Cooking area		
Same building	16	19.8
Separate building	64	80.2
Kitchen ventilation status		
Ventilated	56	69.9
Not ventilated	24	30.1
Respiratory symptoms		
Cough	16	20.4
Phlegm	14	18.1
Wheeze	6	7.8
Dyspnoea	13	16.1
Chest pain	14	18
Chronic diseases		
Heart Failure	1	1.1
Asthma	2	3
Others	3	3.3
No illness	77	96.7
Experience of medical visit		
No visit at all	8	9.8
During symptoms	70	87.7
Regularly	2	2.5

DISCUSSION

The prevalence of spirometry-defined COPD was 19.7% in the current research (16.6% in men and 19.5% in women). This conclusion is consistent with earlier studies done in Uganda which revealed COPD prevalence rates of 16.2 and 17.5%, respectively.[7,8] According to Finney et al the prevalence of COPD in Sub-Saharan Africa ranged from 4 to 25% depending on the criteria employed for diagnosis.[9] Based on spirometry data, Adeloye et al showed that the prevalence of COPD in Africa ranged from 9.4 to 22.1%.[10] According to the Platino research, which was undertaken in five Latin American cities, the prevalence of COPD ranged from 7.8% in Mexico City to 19.7% in Montevideo.[11] Other research from other nations have likewise revealed the prevalence of COPD among adults. In comparison to our findings, some studies reported lower prevalence [6% in Peru, 6.8% in Canada, 6.6% in Egypt, 13.4% in Korea, and 14.2% in Portugal, while others reported higher prevalence (24% in the Netherlands, 18.4% in Greece, and 21.8% in Russia.[12-19] In reality, the incidence of COPD varies by country and by population group within a country.[20] Changes in current findings from other research might be attributed to differences in study population, sample size, diagnostic criteria, methodology, and healthcare systems.

This study found that being over 50 years old was substantially connected with a high frequency of COPD. This results is similar with the findings of earlier research, which found that the prevalence of COPD increased with age, and that old age is a risk factor for developing COPD.[21,24] The link between COPD and old age may be linked to increased risk factor exposure and a physiological decline in respiratory function with age, which begins around the age of 30-40 years.[25,26] As the world population's life expectancy rises, an increasing number of people will be at risk of acquiring COPD in

the future. The changing age structure of the world's population will add to the current increase in COPD prevalence.[21,20]

The current study discovered that participants who were exposed to biomass smoke had a higher risk of COPD than non-exposed participants. Other studies have found that patients who have been exposed to biomass smoke are at a significant risk of getting COPD.[22-27] Biomass smoke contributes significantly to indoor air pollution, which causes COPD globally. The 28 Other research found that women were more exposed to biomass smoke and hence more likely to acquire the condition, which is consistent with our findings.[29,30] Participants who were exposed to biomass smoke for the longest period of time and spent the most hours in close proximity to biomass smoke are more likely to acquire COPD.[31] The components of biomass fuel smoke are irritating to the lungs.[31] It leads to the development of COPD by causing airway thickness due to inflammation, oxidative lung damage, and a protease/antiprotease imbalance.[29] The current study also discovered that cooking in the kitchen with inadequate ventilation was linked to an increased risk of getting COPD. Other research revealed similar results.[20,33] The use of biomass fuels in conjunction with inadequate kitchen ventilation results in significant levels of indoor air pollution and exposure to a variety of contaminants.[34]

The prevalence of COPD was found to be greater in the smoker group (including past and current smokers) than in the non-smoking group in this study. Several research found similar results. Tobacco use is the most frequent risk factor for COPD worldwide.[13,21,24,35] Other research support our findings, demonstrating that men have a longer smoking history than women.[7,36]

Limitations

One of the limitations of this study is the small sample size. Another limitation was the design of the study. To further validate the findings of this study, prospective, comparative studies can be designed.

CONCLUSION

The significant prevalence of COPD among adults in patients presenting to respiratory medicine OPD, MGM medical college, Aurangabad. was one of our findings. According to the findings of this research, the variables that increase a person's likelihood of developing COPD are as follows: advancing age, prolonged exposure to smoke from biomass burning, tobacco use, and inadequate ventilation in the kitchen. To get a better understanding of the role that risk variables like these and others play in the progression of COPD, more research on a larger scale and with a more varied participant pool is required. In addition, in order to mitigate the negative impacts of COPD, there is a requirement for the development of comprehensive national disease management and preventive initiatives. Utilization of alternative, cleaner fuels; improvement of ventilation in kitchens; and quitting smoking are all potential methods that may be implemented.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. National Heart. Lung, and Blood Institute. NHLBI morbidity and mortality chartbook, 2000. Available at http://www. nhlbi.nih.gov/resources/docs/cht-book.htm. Accessed on May 6, 2003.
2. Murray CJL, Lopez AD. Evidence-based health policy: lessons from the global burden of disease study. Science. 1996;274:740-3.
3. Hurd S. The impact of COPD on lung health worldwide: epidemiology and incidence. Chest. 2000;117:1S-4.
4. Voelkel NF. Raising awareness of COPD in primary care. Chest. 2000;117:372S-5.
5. Rabe KF, Hurd S, Anzueto A, Barnes PJ, Buist SA, Calverley P et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. Am J Respir Crit Care Med. 2007;176:532-55.
6. Barreiro TJ, Perillo MD. An Approach to Interpreting Spirometry. Am Fam Physician. 2004;69(5):1107-14.
7. Van Gemert F, Kirenga B, Chavannes N, Kamya M, Luzige S, Musinguzi P et al. Prevalence of chronic obstructive pulmonary disease and associated risk factors in Uganda (fresh air Uganda): a prospective cross-sectional observational study. Lancet Glob Health. 2015;3:e44-51.
8. Magitta NF, Walker RW, Apte KK, Shimwela MD, Mwaiselage JD, Sanga AA et al. Prevalence, risk factors and clinical correlates of COPD in a rural setting in Tanzania. Eur Respir J. 2018;51:1700182.
9. Finney LJ, Feary JR, Leonardi-Bee J, Gordon SB, Mortimer K. Chronic obstructive pulmonary disease in sub-Saharan Africa: a systematic review. Int J Tuber Lung Dis. 2013;17:583-9.
10. Adeloye D, Basquill C, Papana A, Chan KY, Rudan I, Campbell H. An estimate of the prevalence of COPD in Africa: a systematic analysis. COPD. 2015;12(1):71-81.
11. Menezes AM, Perez-Padilla R, Jardim JR, Muiño A, Lopez MV, Valdivia G et al. Chronic obstructive pulmonary disease in five Latin American cities (the PLATINO study): a prevalence study. Lancet. 2005;366:1875-81.
12. Jaganath D, Miranda JJ, Gilman RH, Wise RA, Diette GB, Miele CH et al. Prevalence of chronic obstructive pulmonary disease and variation in risk factors across four geographically diverse resource-limited settings in Peru. Respir Res. 2015;16:40.

13. Bird Y, Moraros J, Mahmood R, Esmaeelzadeh S, Soe NM. Prevalence and associated factors of COPD among aboriginal peoples in Canada: a cross-sectional study. Int J COPD. 2017;12:1915-22.
14. Badway MS, Hamed AF, Yousef FM. Prevalence of chronic obstructive pulmonary disease (COPD) in Qena governorate. Egypt J Chest Dis Tuberc. 2016;65:29-34.
15. Yoo KH, Kim YS, Sheen SS, Park JH, Hwang YI, Kim SH et al. Prevalence of chronic obstructive pulmonary disease in Korea: the fourth Korean National Health and nutrition examination survey. Respirology. 2011;16(4):659-65.
16. Bárbara C, Rodrigues F, Dias H, Cardoso J, Almeida J, Matos MJ, et al. Chronic obstructive pulmonary disease prevalence in Lisbon, Portugal: the burden of obstructive lung disease study. Rev Port Pneumol. 2013;19(3):96-105.
17. Vanfleteren LE, Franssen FM, Wesseling G, Wouters EF. The prevalence of chronic obstructive pulmonary disease in Maastricht, the Netherlands. Respir Med. 2012;106(6):871-4.
18. Minas M, Hatzoglou C, Karetsi E, Papaioannou AI, Tanou K, Tsaroucha R et al. COPD prevalence and the differences between newly and previously diagnosed COPD patients in a spirometry program. Prim Care Respir J. 2010;19(4):363-70.
19. Chuchalin AG, Khaltaev N, Antonov NS, Galkin DV, Manakov LG, Antonini P et al. Chronic respiratory diseases and risk factors in 12 regions of the Russian Federation. Int J Chron Obstruct Pulmon Dis. 2014;9:963-74.
20. Rabe KF, Hurd S, Anzueto A, Barnes PJ, Buist SA, Calverley P et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. Am J Respir Crit Care Med. 2007;176:532-55.
21. Mannino DM, Buist AS. Global burden of COPD: risk factors, prevalence, and future trends. Lancet. 2007;370:765.
22. Sutradhar I, Gupta RD, Hasan M, Wazib A, Sarker M. Prevalence and Risk Factors of Chronic Obstructive Pulmonary Disease in Bangladesh: A Systematic Review. Cureus. 2019;11(1):e3970.
23. Alam DS, Chowdhury MA, Siddiquee AT, Ahmed S, Clemens JD. Prevalence and determinants of chronic obstructive pulmonary disease (COPD) in Bangladesh. COPD: J Chron Obstruct Pulmon Dis. 2015;12(6):658-67.
24. Nugmanova D, Feshchenko Y, Iashyna L, Gyrina O, Malynovska K, Mammadbayov E et al. The prevalence, burden and risk factors associated with chronic obstructive pulmonary disease in commonwealth of independent states (Ukraine, Kazakhstan and Azerbaijan): results of the CORE study. BMC Pulm Med. 2018;18:26.
25. Raherison C, Girodet PO. Epidemiology of COPD. Eur Respir Rev. 2009;18(114):213-21.
26. Salvi SS, Barnes PJ. Chronic obstructive pulmonary disease in non-smokers. Lancet. 2009;374:733-43.
27. Ramírez-Venegas A, Velázquez-Uncal M, Pérez-Hernández R, Guzmán-Bouilloud NE, Falfán-Valencia R, Mayar-Maya ME et al. Prevalence of COPD and respiratory symptoms associated with biomass smoke exposure in a suburban area. Int J COPD. 2018;13:1727-34.
28. Martin WJ, Glass RI, Balbus JM, Collins FS. A major environmental cause of death. Science. 2011;334:180-1.
29. Capistrano S, van Reyk D, Chen H, Oliver B. Evidence of biomass smoke exposure as a causative factor for the development of COPD. Toxics. 2017;5:36.
30. Gordon SB, Bruce NG, Grigg J, Hibberd PL, Kurmi OP, Lam KB et al. Respiratory risks from household air pollution in low- and middle-income countries. Lancet Respir Med. 2014;2:823-60.
31. Salvi S, Barnes PJ. Is exposure to biomass smoke the biggest risk factor for COPD globally? Chest. 2010;138:3-6.
32. Capistrano S, van Reyk D, Chen H, Oliver B. Evidence of biomass smoke exposure as a causative factor for the development of COPD. Toxics. 2017;5:36.
33. Kiraz K, Kart L, Emir R, Oymak S, Gulmez I, Unalacak M et al. Chronic pulmonary disease in rural women exposed to boimass fumes. Clin Invest Med. 2003;26:243-8.
34. Bruce N, Perez-Padilla R, Albalak R. Indoor air pollution in developing countries: a major environmental and public health challenge. Bull World Health Organ. 2000;78(9):1078-92.
35. Andreeva E, Pokhaznikova M, Lebedev A, Moiseeva I, Kutznetsova O, Degryse JM. The prevalence of chronic obstructive pulmonary disease by the global lung initiative equations in North-Western Russia. Respiration. 2016;91(1):4355.
36. Daldoul H, Denguezli M, Jithoo A, Gnatiuc L, Buist S, Burney P et al. Prevalence of COPD and tobacco smoking in Tunisia − results from the BOLD study. Int J Environ Res Public Heal. 2013;10:7257-71.

Cite this article as: Thritia S, Deshmukh H, Deshmukh A, Jadhav S, Kasat S, Roy A et al. Prevalence of obstructive airway disease in pulmonary function tests of patients visiting respiratory medicine out patient department. Int J Res Med Sci 2023;11:941-6.