Section: Community Medicine

Original Research Article

PREVALENCE OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE AMONG ADULTS IN THE FIELD PRACTICE AREA OF CHENGALPATTU MEDICAL COLLEGE: A COMMUNITY-BASED CROSS-SECTIONAL STUDY

Dharmendiran. A[1], Niveditha. S[2], Seetha Kumari. M[3], Manikandan. R[4]

[1,3]Assistant Professor, Department of Community Medicine, Government Villupuram Medical College, Villupuram, Tamil Nadu, India.
[2]Assistant Professor, Department of Community Medicine, Government Ariyalur Medical College, Ariyalur, Tamil Nadu, India.
[4]Assistant Professor, Department of Community Medicine, Government Cuddalore Medical College, Cuddalore, Tamil Nadu, India.

Received *: 07/01/2026*
Received in revised form *: 18/02/2026*
Accepted *: 05/03/2026*

Corresponding Author:
Dr. Dharmendiran. A,
Assistant Professor, Department of Community Medicine, Government Villupuram Medical College, Villupuram, Tamil Nadu, India..
Email: drdharma77@rediffmail.com

DOI: 10.70034/ijmedph.2026.1.565

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (1); 3293-3296

ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) is a major non-communicable disease contributing substantially to morbidity and mortality, particularly in low- and middle-income countries like India. Community-based data from rural South India are limited. **Objectives:** To estimate the prevalence of COPD among adults aged ≥30 years and to identify associated risk factors.
Materials and Methods: A community-based cross-sectional study was conducted from April 2021 to April 2022 among 450 adults aged ≥30 years using multistage random sampling. Data were collected using a pre-tested semi-structured questionnaire capturing sociodemographic details, smoking history, environmental exposures, respiratory symptoms, and past history of tuberculosis. Anthropometry was recorded. Peak expiratory flow rate (PEFR) was measured using a standardized peak flow meter, and COPD was defined as PEFR <80% of predicted values. Data were analyzed using SPSS version 25. Associations were assessed using chi-square test and binary logistic regression.
Results: The prevalence of COPD was 8%. COPD was significantly more common among males (19%) compared to females (2.4%) and increased with age ($p<0.001$). Smoking, higher pack-years, biomass fuel exposure, inadequate ventilation, lack of separate kitchen, past history of tuberculosis, and presence of respiratory symptoms were significantly associated with COPD. On multivariate analysis, inadequate ventilation (AOR=0.17; 95% CI: 0.06–0.51), longer smoking duration (AOR=0.11; 95% CI: 0.02–0.57), past history of tuberculosis (AOR=40.2; 95% CI: 2.8–573.6), and breathlessness (AOR=5.7; 95% CI: 1.8–17.8) emerged as independent predictors.
Conclusion: COPD prevalence was high among adults in this rural population, with multiple modifiable risk factors. Early screening using PEFR, smoking cessation, and reduction of indoor air pollution are essential to reduce the burden of COPD.
Keywords: Chronic obstructive pulmonary disease, Prevalence, Risk factors, Peak expiratory flow rate, Rural India.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a common, preventable, and treatable disease characterized by persistent airflow limitation and chronic airway inflammation.[1] COPD is currently the third leading cause of death worldwide, with the majority of deaths occurring in low- and middle-income countries.[2] India contributes substantially to the global burden of COPD, accounting for a large share of morbidity, mortality, and disability-adjusted life years (DALYs).[3,4]

Tobacco smoking remains the principal risk factor globally.[1,5] In addition, exposure to biomass fuel, household air pollution, occupational dust, and prior pulmonary tuberculosis significantly increase COPD risk, especially in rural populations.[6-8] Despite this growing burden, community-based data from rural South India remain limited. The present study was conducted to estimate the prevalence of COPD and identify associated risk factors among adults aged ≥30 years.

MATERIALS AND METHODS

A community-based cross-sectional study was conducted in the Manampathi block field practice area of Chengalpattu Medical College, Tamil Nadu. Adults aged ≥30 years residing in the area for at least one year were included. Individuals unwilling to participate or with acute severe illness were excluded.

Sample size was calculated as 450 based on an expected prevalence of 19% and 10% non-response. Multistage random sampling was used to select participants. Data were collected using a pre-tested questionnaire. Height, weight, and PEFR were measured following standard procedures. COPD was defined as PEFR <80% of predicted values. Data were analyzed using SPSS version 25; $p<0.05$ was considered statistically significant.

RESULTS

Table 1: Sociodemographic and Household Characteristics of Study Participants (n = 450)

Variable	Category	n (%)
Age group (years)	30–39	125 (27.8)
	40–49	132 (29.3)
	50–59	121 (26.9)
	≥60	72 (16.0)
Gender	Male	153 (34.0)
	Female	297 (66.0)
Socioeconomic status	Class I–II	96 (21.4)
	Class III	106 (23.6)
	Class IV–V	248 (55.0)
Ventilation	Adequate	305 (67.8)
	Inadequate	145 (32.2)
Cooking fuel	LPG only	242 (53.8)
	Biomass ± LPG	192 (42.7)
	Kerosene	15 (3.3)

Among the 450 participants, the majority were aged 40–49 years (29.3%), and females constituted two-thirds (66.0%) of the study population. More than half (55.0%) belonged to lower socioeconomic classes (IV–V). Nearly one-third (32.2%) of households had inadequate ventilation, and 42.7% used biomass fuel either alone or along with LPG, indicating significant exposure to indoor air pollution.

Table 2: Distribution of Major Risk Factors (n = 450)

Risk Factor	n (%)
Current smoker	40 (8.9)
Ex-smoker	24 (5.3)
Smoking ≥20 pack-years	23 (5.1)
Biomass fuel exposure	142 (31.6)
Inadequate ventilation	145 (32.2)
Overcrowding	255 (56.7)
Low BMI (<18.5 kg/m²)	33 (7.3)
Past history of tuberculosis	9 (2.0)

Smoking prevalence was 8.9% among participants, with 5.1% reporting ≥20 pack-years. Biomass fuel exposure was observed in 31.6% of individuals. Overcrowding was present in more than half (56.7%) of households. A past history of pulmonary tuberculosis was reported by 2.0% of participants.

Table 3: Prevalence and Distribution of COPD (n = 450)

Variable	COPD Present n (%)	COPD Absent n (%)
Overall	36 (8.0)	414 (92.0)
Gender		
Male	29 (19.0)	124 (81.0)
Female	7 (2.4)	290 (97.6)
Age group (years)		
30–39	1 (0.8)	124 (99.2)
40–49	8 (6.1)	124 (93.9)
50–59	11 (9.1)	110 (90.9)

≥60	16 (22.2)	56 (77.8)

The overall prevalence of COPD was 8.0%. COPD was significantly higher among males (19.0%) compared to females (2.4%). A clear age-related increasing trend was observed, with prevalence rising from 0.8% in the 30–39 year group to 22.2% among participants aged ≥60 years.

Table 4: Association between Selected Factors and COPD (n = 450)

Factor	COPD Present n (%)	p value
Male gender	29 (19.0)	<0.001
Smoking ≥20 pack-years	23 (54.8)	<0.001
Biomass fuel use	16 (12.7)	0.011
Inadequate ventilation	23 (15.9)	<0.001
No separate kitchen	27 (12.8)	<0.001
Past history of TB	7 (77.8)	<0.001
Breathlessness	25 (21.6)	<0.001

On bivariate analysis, male gender, heavy smoking, biomass fuel use, inadequate ventilation, absence of a separate kitchen, past history of tuberculosis, and breathlessness were significantly associated with COPD ($p<0.05$).

Table 5: Binary Logistic Regression Analysis of Predictors of COPD

Predictor	Adjusted OR	95% CI	p value
Inadequate ventilation	0.17	0.06–0.51	0.002
Smoking duration	0.11	0.02–0.57	0.008
Past history of tuberculosis	40.20	2.82–573.58	0.006
Breathlessness	5.73	1.84–17.85	0.003

Multivariate analysis identified inadequate ventilation, longer smoking duration, past history of tuberculosis, and breathlessness as independent predictors of COPD. Past tuberculosis showed a particularly strong association.

DISCUSSION

The present study found an overall COPD prevalence of 8% among adults aged ≥30 years, indicating a substantial burden in this rural population. This estimate is comparable to other Indian community-based studies reporting prevalence between 6% and 10%.[9,10]

A clear age-related increase in prevalence was observed, with higher rates among individuals aged ≥50 years. Age-related decline in lung function and cumulative exposure to environmental and behavioral risk factors likely explain this trend.[11]

Male participants had significantly higher prevalence compared to females, primarily due to higher tobacco exposure patterns in rural India.[9,12]

Smoking emerged as the most significant modifiable risk factor. Longer duration and higher pack-years were strongly associated with COPD. This finding is consistent with global evidence demonstrating the causal relationship between tobacco exposure and airflow limitation.[1,5] Strengthening smoking cessation strategies at the primary healthcare level remains critical.

Household air pollution also played a major role. Biomass fuel exposure and inadequate ventilation were significantly associated with COPD in this study. Chronic exposure to biomass smoke in poorly ventilated kitchens is a well-recognized determinant of COPD among non-smoking women in rural settings.[6,13]

Past history of pulmonary tuberculosis was identified as a strong independent predictor. Structural lung damage following tuberculosis can result in persistent airflow limitation, increasingly recognized as post-tuberculosis lung disease.[7,14] These findings underscore the need for long-term respiratory follow-up among tuberculosis survivors.

The use of PEFR as a screening tool proved feasible in this community-based setting. While spirometry remains the gold standard, PEFR offers a pragmatic alternative for early detection in resource-limited primary healthcare facilities.[15]

Overall, COPD in this rural setting appears to be driven by a combination of tobacco use, household air pollution, and prior tuberculosis, compounded by aging and socioeconomic factors. Integrated preventive strategies focusing on risk factor reduction and early screening are essential to mitigate the growing burden.

CONCLUSION

This study demonstrates a considerable burden of COPD among adults in a rural South Indian population. Multiple modifiable risk factors, particularly tobacco smoking and household air pollution, significantly contribute to disease occurrence. Strengthening tobacco control programs, promoting clean cooking fuels, improving ventilation, and integrating respiratory screening into primary healthcare services are crucial to reducing COPD-related morbidity and mortality. Special attention should be given to post-tuberculosis respiratory care.

Acknowledgements: The authors sincerely thank the study participants for their cooperation. We also acknowledge the support of the field staff and interns of the Department of Community Medicine, Chengalpattu Medical College, for their assistance in data collection and field coordination.

Funding: This research received no external funding and was conducted as part of departmental academic research activities.

Conflict of Interest: The authors declare that there is no conflict of interest.

REFERENCES

1. Global Initiative for Chronic Obstructive Lung Disease. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: 2024 report.
2. World Health Organization. Chronic obstructive pulmonary disease (COPD). Geneva: WHO; 2023.
3. India State-Level Disease Burden Initiative CRD Collaborators. The burden of chronic respiratory diseases in India. Lancet Glob Health. 2018;6:e1363–74.
4. Salvi S, Agarwal A. India faces an epidemic of chronic respiratory diseases. Lancet. 2018;392:221–3.
5. GBD 2019 Risk Factors Collaborators. Global burden of 87 risk factors. Lancet. 2020;396:1223–49.
6. World Health Organization. Household air pollution and health. Geneva: WHO; 2023.
7. Allwood BW, et al. Post-tuberculosis lung disease. Int J Tuberc Lung Dis. 2017;21:135–42.
8. Siddharthan T, et al. Association between household air pollution and COPD outcomes. Am J Respir Crit Care Med. 2018;197:611–20.
9. Jindal SK, et al. Epidemiology of COPD in India. Indian J Chest Dis Allied Sci. 2006;48:23–9.
10. Daniel RA, et al. Prevalence of COPD in rural South India. Lung India. 2016;33:183–7.
11. Burney PG, et al. Global prevalence of COPD. Thorax. 2015;70:654–60.
12. Aggarwal AN, et al. COPD epidemiology in India. Indian J Med Res. 2014;139:209–16.
13. Kurmi OP, et al. Lung cancer and COPD risk from biomass fuel smoke. Thorax. 2010;65:221–8.
14. Meghji J, et al. Long-term respiratory complications of tuberculosis. Thorax. 2016;71:993–1001.
15. Perez-Padilla R, et al. Spirometry and alternatives in low-resource settings. Am J Respir Crit Care Med. 2006;173:1426–32.