Original Research

PREVALENCE AND CLINICAL CORRELATES OF PRESERVED RATIO IMPAIRED SPIROMETRY AMONG ADULTS ATTENDING A TERTIARY-CARE NON-COMMUNICABLE DISEASE CLINIC

Kagollu Pradeep kumar[1*], A. Krishna sawarup Reddy[2], Sreeja Reddy Dyapaa[3], G.Gopikrishna[4], K.Prasanna kumar Reddy[5]

[1*]Assistant professor, Department of Pulmonary medicine, MNR medical college, Sangareddy.
[2,3]Junior Resident, Department of Pulmonary medicine, MNR medical college Sangareddy.
[4,5]Professor, Department of Pulmonary medicine, MNR medical college Sangareddy.

Corresponding Author: Kagollu Pradeep kumar
Assistant professor, Department of Pulmonary medicine, MNR medical college, Sangareddy.
Email: pradeep4msimhapuri@gmail.com

ABSTRACT

Background: Preserved ratio impaired spirometry (PRISm) is an under-recognized spirometric abnormality that may occur in individuals with cardiometabolic comorbidities despite absence of overt obstructive lung disease. This study aimed to estimate the prevalence of PRISm and evaluate its clinical and spirometric correlates among adults attending a tertiary-care non-communicable disease clinic.

Methods: This prospective observational study included 100 adults aged more than 40 years with at least one non-communicable disease, including diabetes mellitus, hypertension, or dyslipidemia. Demographic, anthropometric, clinical, smoking-related, and dyspnea data were collected. Post-bronchodilator spirometry was performed, and participants were classified as having normal spirometry, obstructive spirometry, or PRISm. PRISm was defined as FEV_1 <80% predicted with FEV_1/FVC ≥0.70. Associations were assessed using chi-square or Fisher's exact test, and spirometric parameters were compared using one-way ANOVA.

Results: The mean age was 61.95 ± 6.74 years, and 53.0% were men. Normal spirometry was observed in 62.0% of participants, obstructive spirometry in 23.0%, and PRISm in 15.0%. Among PRISm cases, restrictive PRISm was more frequent than non-restrictive PRISm (73.3% vs 26.7%). Lung-function pattern was significantly associated with sex, high waist circumference, diabetes mellitus, hypertension, dyslipidemia, smoking status, number of NCD comorbidities, and mMRC dyspnea grade. Spirometric parameters differed significantly across groups.

Conclusion: PRISm was common among adults attending an NCD clinic and was associated with central obesity, cardiometabolic comorbidity, and dyspnea. Routine spirometry may help identify unrecognized respiratory impairment in high-risk NCD populations.

Keywords: Prism, Spirometry, Non-Communicable Diseases, Diabetes Mellitus, Central Obesity.

INTRODUCTION

Non-communicable diseases (NCDs) are now a dominant contributor to morbidity and mortality in India, with cardiometabolic disorders such as diabetes mellitus, hypertension, dyslipidemia, and obesity forming a major component of the contemporary disease burden [1]. Although the cardiovascular, renal, and metabolic consequences of these conditions are routinely assessed in clinical practice, respiratory impairment in patients with NCDs often remains under-recognized. This is clinically important because spirometric abnormalities may occur even in individuals without a prior diagnosis of chronic obstructive pulmonary disease (COPD) or other established chronic lung disease.

www.ajmrhs.com
eISSN: 2583-7761

Date of Received: 22-05-20256
Date Acceptance: 30-05-2026
DateofPublication:07-07-2026

Preserved ratio impaired spirometry (PRISm) is a distinct spirometric pattern characterized by reduced forced expiratory volume in one second (FEV_1 <80% predicted) with a preserved FEV_1/forced vital capacity (FVC) ratio, usually defined as FEV_1/FVC ≥0.70 [2]. Unlike obstructive spirometry, PRISm does not fulfil conventional criteria for airflow obstruction; however, it should not be considered a normal finding. Previous cohort studies have shown that PRISm is relatively common, heterogeneous, and associated with respiratory symptoms, reduced exercise capacity, systemic inflammation, and increased comorbidity burden [2,3].

The clinical significance of PRISm has become increasingly evident. In the COPDGene cohort, PRISm was observed in 12.3% of current and former smokers and included phenotypically diverse subgroups, including restrictive, COPD-like, and metabolic subtypes [2]. In the UK Biobank, PRISm was present in approximately 11% of participants and was associated with breathlessness, multimorbidity, progression to airflow obstruction

in a subset of individuals, and increased all-cause mortality [3]. Similarly, pooled population-based data from the United States showed that PRISm was associated with higher risks of all-cause mortality, respiratory-related mortality, coronary heart disease-related mortality, and respiratory and cardiovascular events compared with normal spirometry [4]. Longitudinal studies have further demonstrated that PRISm is a dynamic state, with some individuals reverting to normal spirometry while others progress to airflow obstruction or remain persistently impaired [5].

Cardiometabolic disease appears to be closely linked with PRISm. Studies have reported higher frequencies of obesity, hypertension, diabetes mellitus, cardiovascular disease, and multimorbidity among individuals with PRISm compared with those with normal spirometry [6]. Diabetes mellitus is particularly relevant because pulmonary function impairment in type 2 diabetes is commonly characterized by reductions in FEV_1 and FVC without a proportional reduction in the FEV_1/FVC ratio, resembling the physiological pattern seen in PRISm [7]. Moreover, among individuals with type 2 diabetes, PRISm has been associated with increased risks of macrovascular complications, microvascular complications, and mortality, suggesting that spirometric impairment may identify a clinically vulnerable subgroup within the diabetic population [8].

Despite growing international evidence, data on PRISm among Indian patients with NCDs remain limited. This gap is important because Indian NCD-clinic populations frequently have clustering of diabetes mellitus, hypertension, dyslipidemia, central obesity, and smoking exposure, all of which may influence lung function. Identifying PRISm in such patients may help detect previously unrecognized respiratory impairment and improve risk stratification beyond conventional cardiometabolic assessment. Therefore, the present study was conducted to estimate the prevalence of PRISm and evaluate its demographic, anthropometric, clinical, smoking-related, and spirometric correlates among adults attending a tertiary-care NCD clinic in Telangana, India.

MATERIALS AND METHODS

Study design and setting

This prospective observational study was conducted in the Department of Pulmonary Medicine, MNR Medical College and Hospital, Sangareddy, Telangana, India, over an 18-month period after obtaining institutional approvals. The study was designed to estimate the prevalence of preserved ratio impaired spirometry (PRISm) and to evaluate its demographic, anthropometric, clinical, smoking-related, and spirometric correlates among individuals attending a tertiary-care non-communicable disease clinic.

Study population

The study included adults aged more than 40 years who were diagnosed with at least one non-communicable disease, including diabetes mellitus, hypertension, or dyslipidemia. Participants were enrolled after obtaining informed consent.

Individuals were excluded if they did not provide consent, had a previously diagnosed obstructive lung disease, were unable to perform acceptable spirometry because of acute illness, severe dyspnea, cognitive impairment, or neurological deficits, or had contraindications to spirometry such as pneumothorax, recent thoracic or abdominal surgery, hemoptysis, recent myocardial infarction, or recent stroke. Pregnant women in the third trimester were also excluded.

Sample size

The sample size was calculated using the formula:

$$N = Z^2pq / d^2$$

where Z = 1.96 for 95% confidence level, p = 7% based on the estimated prevalence of COPD in India, q = 93, and d = 5% absolute precision. The calculated sample size was approximately 100. Therefore, a final sample size of 100 participants was included in the study.

Data collection

After enrollment, all participants underwent structured clinical assessment. Information was collected regarding age, sex, smoking status, cumulative smoking exposure, and history of non-communicable diseases, including diabetes mellitus, hypertension, and dyslipidemia. Smoking status was categorized as current smoker, former smoker, or never smoker. Smoking exposure was recorded in pack-years.

Anthropometric measurements included height, weight, body mass index, and waist circumference. Body mass index was calculated as weight in kilograms divided by height in meters squared. Waist circumference was categorized as high using standard sex-specific criteria. The total number of non-communicable disease comorbidities present in each participant was also recorded.

Dyspnea severity was assessed using the modified Medical Research Council dyspnea scale.

Spirometry procedure

Spirometry was performed using an NDD spirometer by trained personnel according to standard testing procedures. Post-bronchodilator spirometry values were used for classification. The main spirometric variables recorded were forced expiratory volume in one second percentage predicted, forced vital capacity percentage predicted, and the FEV_1/FVC ratio.

Spirometric classification

Participants were classified into three lung-function categories based on post-bronchodilator spirometry:
Normal spirometry: FEV_1 ≥80% predicted, FVC ≥80% predicted, and FEV_1/FVC ≥0.70.
Preserved ratio impaired spirometry: FEV_1 <80% predicted with FEV_1/FVC ≥0.70.
Obstructive spirometry: FEV_1 <80% predicted with FEV_1/FVC <0.70.
PRISm cases were further subtyped according to FVC. Participants with PRISm and FVC <80% predicted were classified as restrictive PRISm, whereas those with PRISm and FVC ≥80% predicted were classified as non-restrictive PRISm.

Outcome measures

The primary outcome was the prevalence of PRISm among the study population. PRISm prevalence was calculated as:

Number of participants with PRISm / Total number of participants × 100

Secondary outcomes included the distribution of normal, obstructive, and PRISm spirometric patterns; distribution of PRISm subtypes; association of lung-function patterns with age group, sex, waist circumference, diabetes mellitus, hypertension, dyslipidemia, smoking status, number of NCD comorbidities, and mMRC dyspnea score; and comparison of spirometric parameters across lung-function categories.

Statistical analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 30. Categorical variables were summarized as frequency and percentage in the format **n (%)**. Continuous variables were expressed as mean ± standard deviation.

Associations between categorical variables and lung-function patterns were assessed using the chi-square test. Fisher's exact test was used where expected cell counts were small. Continuous spirometric parameters were compared across normal, obstructive, and PRISm groups using one-way analysis of variance. Test statistics were reported with corresponding p-values. A p-value <0.05 was considered statistically significant.

Ethical considerations

The study was conducted after obtaining Institutional Ethics Committee approval. Written informed consent was obtained from all participants before enrollment. Participant confidentiality was maintained throughout the study.

RESULTS

Study population and baseline profile

A total of 100 participants aged >40 years attending the non-communicable disease clinic were included in the analysis. The mean age was 61.95 ± 6.74 years, and the mean BMI was 27.46 ± 2.54 kg/m². Men comprised 53 (53.0%) participants. The cohort represented a cardiometabolic high-risk population: hypertension was present in 83 (83.0%) participants, diabetes mellitus in 66 (66.0%), and dyslipidemia in 40 (40.0%). Central obesity was common, with high waist circumference recorded in 74 (74.0%) participants. Current smoking was reported by 36 (36.0%) participants, while 24 (24.0%) were former smokers.

Baseline clinical characteristics varied across spirometric patterns (Table 1). Participants with obstructive spirometry were older and had a higher proportion of current or former smoking. Participants with PRISm had a high burden of central obesity and cardiometabolic comorbidity. Sex distribution, high waist circumference, diabetes mellitus, hypertension, dyslipidemia, smoking status, number of NCD comorbidities, and mMRC dyspnea grade were significantly associated with lung-function pattern.

Table 1. Baseline, Clinical and Exposure Characteristics According To Lung-Function Pattern.

Characteristic	Overall (N=100)	Normal (n=62)	Obstructive (n=23)	PRISm (n=15)	Test statistic	p value
Age, years, mean ± SD	61.95 ± 6.74	60.84 ± 6.73	66.35 ± 5.78	59.80 ± 5.41	ANOVA F=7.34; df=2,97	0.001
BMI, kg/m², mean ± SD	27.46 ± 2.54	26.21 ± 2.13	29.13 ± 1.71	30.07 ± 1.53	ANOVA F=34.13; df=2,97	<0.001
Male sex	53 (53.0)	23 (37.1)	19 (82.6)	11 (73.3)	χ^2=16.88; df=2	<0.001
High waist circumference	74 (74.0)	37 (59.7)	22 (95.7)	15 (100.0)	χ^2=17.49; df=2	<0.001
Diabetes mellitus	66 (66.0)	31 (50.0)	22 (95.7)	13 (86.7)	χ^2=18.94; df=2	<0.001
Hypertension	83 (83.0)	47 (75.8)	22 (95.7)	14 (93.3)	χ^2=6.02; df=2	0.049

Dyslipidemia	40 (40.0)	20 (32.3)	10 (43.5)	10 (66.7)	χ^2=6.11; df=2	0.047
Smoking status: current	36 (36.0)	19 (30.6)	14 (60.9)	3 (20.0)	χ^2=16.86; df=4	0.002
former	24 (24.0)	13 (21.0)	8 (34.8)	3 (20.0)		
never	40 (40.0)	30 (48.4)	1 (4.3)	9 (60.0)		
NCD count: 1	33 (33.0)	33 (53.2)	0 (0.0)	0 (0.0)	χ^2=32.88; df=4	<0.001
2	45 (45.0)	22 (35.5)	15 (65.2)	8 (53.3)		
3	22 (22.0)	7 (11.3)	8 (34.8)	7 (46.7)		
mMRC score: 0	17 (17.0)	17 (27.4)	0 (0.0)	0 (0.0)	χ^2=79.01; df=6	<0.001
1	36 (36.0)	34 (54.8)	0 (0.0)	2 (13.3)		
2	37 (37.0)	11 (17.7)	13 (56.5)	13 (86.7)		
3	10 (10.0)	0 (0.0)	10 (43.5)	0 (0.0)		

Values are n (%) unless otherwise indicated. Percentages in pattern columns are calculated within each lung-function pattern. Chi-square tests were used for categorical variables and one-way ANOVA for continuous variables.

Distribution of lung-function patterns and PRISm subtypes

Normal spirometry was the most frequent pattern, observed in 62 (62.0%) participants. Abnormal spirometry was present in 38 (38.0%) participants, including obstructive spirometry in 23 (23.0%) and PRISm in 15 (15.0%) (Table 2; Figure 1). The prevalence of PRISm was therefore 15.0% in this NCD-clinic population.

Among the 15 participants with PRISm, restrictive PRISm was more frequent than non-restrictive PRISm. Restrictive PRISm accounted for 11 (73.3%) PRISm cases, while non-restrictive PRISm accounted for 4 (26.7%). This indicates that reduced FVC contributed substantially to the PRISm phenotype in the study cohort.

Table 2. Prevalence of Lung-Function Patterns and Prism Subtypes

Outcome	n/N	%	95% CI
Normal spirometry	62/100	62.0	52.2–70.9
Obstructive pattern	23/100	23.0	15.8–32.2
PRISm	15/100	15.0	9.3–23.3
Restrictive PRISm	11/15	73.3	48.0–89.1
Non-restrictive PRISm	4/15	26.7	10.9–52.0

Confidence intervals were calculated using the Wilson method. PRISm subtype percentages use participants with PRISm as the denominator.

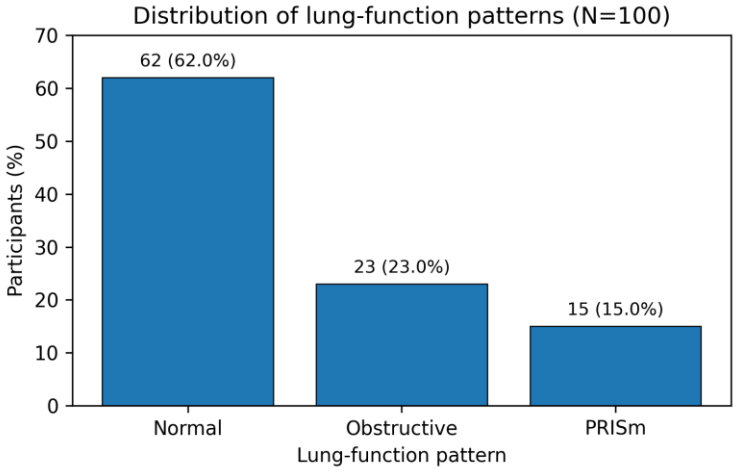

Figure 1. Distribution of Lung-Function Patterns among Study Participants.

Comorbidity Burden, Smoking Status and Dyspnea across Patterns

Abnormal spirometric patterns clustered among participants with cardiometabolic comorbidity. Diabetes mellitus was present in 31 (50.0%) participants with normal spirometry, 22 (95.7%) with obstructive spirometry, and 13 (86.7%) with PRISm. Hypertension and dyslipidemia showed similar associations with lung-function pattern, with the highest dyslipidemia proportion observed in the PRISm group.

The number of NCD comorbidities showed a clear association with spirometric abnormality (χ^2=32.88; df=4; p<0.001). All participants with one NCD had normal spirometry, whereas obstructive and PRISm patterns were concentrated among those with two or three NCDs (Figure 2). Smoking status was also significantly associated with lung-function pattern. Obstructive spirometry was predominantly observed among current and former smokers, while PRISm was observed across smoking categories, including 9 (60.0%) never smokers within the PRISm group.

Dyspnea burden differed markedly across spirometric patterns. Participants with normal spirometry mostly reported mMRC grade 0 or 1, whereas participants with obstructive spirometry predominantly reported mMRC grade 2 or 3. Most PRISm participants had mMRC grade 2 dyspnea, supporting the clinical relevance of PRISm despite preservation of the FEV_1/FVC ratio.

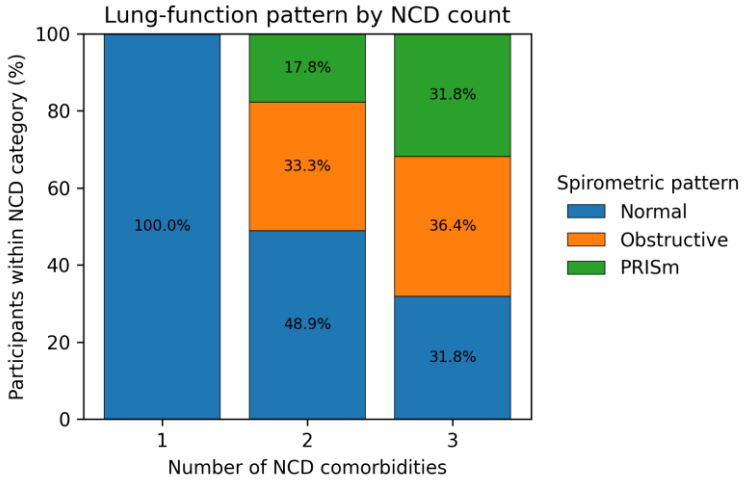

Figure 2. Lung-Function Pattern Distribution by Number of Non-Communicable Disease Comorbidities

Percentages are calculated within each NCD-count category.

Spirometric parameters

Post-bronchodilator spirometric values differed significantly across lung-function patterns (Table 3). The obstructive group had the lowest mean FEV_1 % predicted and FEV_1/FVC ratio, consistent with airflow limitation. The PRISm group demonstrated reduced FEV_1 with a preserved FEV_1/FVC ratio, distinguishing it from the obstructive group. FVC was lowest in the PRISm group, consistent with the predominance of restrictive PRISm among PRISm cases.

Across the three spirometric categories, differences in FEV_1 % predicted, FVC % predicted and FEV_1/FVC were statistically significant by one-way ANOVA (all p<0.001). The observed spirometric gradient supports the separation of normal, obstructive and PRISm phenotypes in the study population.

Table 3. Spirometric Parameters According To Lung-Function Pattern.

Parameter	Overall (N=100)	Normal (n=62)	Obstructive (n=23)	PRISm (n=15)	Test statistic	p value
FEV_1 % predicted	79.72 ± 11.23	87.85 ± 3.02	62.83 ± 3.58	72.00 ± 2.36	ANOVA F=612.81; df=2,97	<0.001
FVC % predicted	88.26 ± 6.34	92.15 ± 3.08	84.87 ± 2.32	77.40 ± 4.69	ANOVA F=143.17; df=2,97	<0.001

FEV_1/FVC	0.76 ± 0.08	0.79 ± 0.03	0.63 ± 0.05	0.80 ± 0.00	ANOVA F=241.69; df=2,97	<0.001

Values are mean ± SD. Comparisons were performed using one-way ANOVA.

DISCUSSION

In this prospective observational study of adults attending a tertiary-care non-communicable disease clinic, PRISm was identified in 15.0% of participants, while abnormal spirometry overall was present in 38.0%. The PRISm phenotype was characterized by high cardiometabolic burden, universal central obesity, frequent diabetes mellitus, hypertension and dyslipidemia, and clinically relevant dyspnea despite preservation of the FEV_1/FVC ratio. Restrictive PRISm accounted for 73.3% of PRISm cases, suggesting that reduced FVC was a major contributor to the PRISm pattern in this cohort. These findings indicate that PRISm is a clinically meaningful spirometric abnormality in patients with NCDs and not merely an incidental finding.

The prevalence of PRISm in the present study is comparable to Asian population-based estimates, although our cohort was enriched for cardiometabolic risk. In the OCEAN study from Japan, PRISm was present in 16.7% of 2,518 community participants, whereas airflow limitation was observed in only 2.1% [9]. PRISm participants in that study had higher BMI, greater prevalence of hypertension, diabetes and hyperlipidemia, and included a substantial proportion of never-smokers [9]. These findings align closely with our observation that PRISm was frequent in an NCD-clinic population and was not confined to smokers. However, the higher burden of diabetes, hypertension and central obesity in our cohort may explain the predominance of restrictive PRISm.

Data from low- and middle-income countries also support the relevance of PRISm outside COPD-focused populations. Siddharthan et al. analyzed post-bronchodilator spirometry from 10,664 adults in Nepal, Peru and Uganda and reported wide variation in PRISm prevalence, ranging from 2.5% in Peru to 16.0% in Uganda [10]. PRISm was associated with worse health status, varied substantially across settings despite standardized spirometry, and represented a non-obstructive impairment pattern that would be missed if screening focused only on airflow obstruction [10]. Our 15.0% prevalence is close to the upper range of this LMIC estimate and reinforces the need to recognize PRISm in resource-limited and cardiometabolic high-risk clinical settings.

The strong clustering of PRISm with NCD burden in our study is supported by Korean national survey data. Heo et al. evaluated 27,824 adults aged 40 years or older and identified 1,875 individuals with PRISm [11]. PRISm was associated with hypertension, diabetes, obesity, low physical activity and ever-smoking, and participants with PRISm had poorer health-related quality of life, especially in mobility, self-care and usual activity domains [11]. Similarly, in our study, PRISm was concentrated among participants with multiple NCDs and was accompanied by dyspnea. This suggests that PRISm may reflect systemic vulnerability related to obesity, metabolic dysfunction, reduced physical capacity and cardiopulmonary reserve.

Smoking showed a distinct pattern in the present cohort. Obstructive spirometry was concentrated among current and former smokers, whereas PRISm occurred across smoking categories, including never-smokers. This differs from smoker-enriched cohorts but remains biologically plausible. Shin et al. studied 7,115 smokers and found 689 individuals with PRISm, who had high BMI, a high proportion of current smoking, and reduced FEV_1 and FVC compared with smokers with normal spirometry [12]. Respiratory-related emergency visits, hospitalizations and medical costs in smokers with PRISm were comparable to COPD, and lower FEV_1 and FVC were associated with greater medical utilization [12]. These findings show that PRISm may carry clinical burden in smokers, while our data suggest that in NCD-clinic populations, metabolic factors may be equally or more important.

The predominance of restrictive PRISm in our cohort is particularly relevant because all PRISm participants had high waist circumference and the PRISm group had the lowest mean FVC. Miura et al. demonstrated that PRISm is heterogeneous when stratified by restrictive spirometric abnormality [13]. Restrictive PRISm was associated with older age, female sex and higher BMI, whereas non-restrictive PRISm was more strongly linked to smoking exposure and asthma history [13]. Over five years, non-restrictive PRISm progressed to airflow obstruction more frequently than normal spirometry, while restrictive PRISm was not independently associated with future obstruction [13]. These findings suggest that the restrictive predominance in our study may represent an obesity-metabolic PRISm phenotype rather than a primarily airway-obstructive precursor state. Nevertheless, spirometry alone cannot confirm true restriction, and lung volume measurement would be required.

The clinical importance of PRISm extends beyond respiratory symptoms. Zheng et al. analyzed

329,954 participants without baseline cardiovascular disease and found that PRISm was associated with increased risks of major adverse cardiovascular events, myocardial infarction, heart failure, stroke and cardiovascular mortality [14]. Persistent PRISm conferred higher cardiovascular risk than stable normal spirometry, whereas transition from PRISm to normal spirometry was associated with lower risk [14]. These observations are highly relevant to our NCD-clinic population, where PRISm clustered with established cardiovascular risk factors. Spirometric impairment in such patients may therefore provide additional risk information beyond routine metabolic assessment.

Longitudinal evidence further indicates that PRISm is dynamic and prognostically important. Marott et al. showed that persistent PRISm and transition from normal spirometry to PRISm were associated with increased risks of pneumonia admission, COPD admission and all-cause mortality [15]. Individuals who moved from PRISm to normal spirometry had outcomes closer to those with persistently normal spirometry, suggesting that PRISm may be a modifiable or reversible risk state in some patients [15]. These data support the value of repeat spirometry and longitudinal follow-up, particularly for symptomatic NCD patients with reduced FEV_1 or FVC despite a preserved FEV_1/FVC ratio.

The present study has several strengths. It evaluated PRISm in an Indian NCD-clinic population, a group in whom respiratory impairment may be under-recognized despite high cardiometabolic risk. Post-bronchodilator spirometry was used for classification, and the analysis incorporated anthropometric, comorbidity, smoking, dyspnea and spirometric variables. Subtyping PRISm into restrictive and non-restrictive patterns also provided clinically useful phenotypic information.

The study also has limitations. The sample size was modest, with only 15 PRISm cases, limiting multivariable analysis and subgroup comparisons. The single-center tertiary-care design may limit generalizability. Although the study was prospective in enrollment, the analysis of spirometric correlates was cross-sectional; therefore, causality and progression cannot be inferred. Restriction was inferred from reduced FVC and was not confirmed by total lung capacity. Diffusion capacity, chest imaging, impulse oscillometry, inflammatory markers and exercise testing were not available, limiting mechanistic interpretation. Finally, some categorical comparisons involved small cell counts, for which exact tests may be preferable.

CONCLUSION

PRISm was common among adults attending a tertiary-care NCD clinic and was associated with central obesity, cardiometabolic comorbidity and dyspnea. The predominance of restrictive PRISm suggests that obesity and metabolic disease may be important contributors to impaired spirometry in this population. These findings support the incorporation of spirometry into NCD-clinic assessment to identify previously unrecognized respiratory impairment and to guide follow-up, risk stratification and integrated cardiopulmonary care.

REFERENCES

1. India State-Level Disease Burden Initiative Collaborators. Nations within a nation: variations in epidemiological transition across the states of India, 1990–2016 in the Global Burden of Disease Study. *Lancet*. 2017;390(10111):2437–2460. DOI: 10.1016/S0140-6736(17)32804-0
2. Wan ES, Castaldi PJ, Cho MH, et al. Epidemiology, genetics, and subtyping of preserved ratio impaired spirometry (PRISm) in COPDGene. *Respiratory Research*. 2014;15:89. DOI: 10.1186/s12931-014-0089-y
3. Higbee DH, Granell R, Davey Smith G, Dodd JW. Prevalence, risk factors, and clinical implications of preserved ratio impaired spirometry: a UK Biobank cohort analysis. *Lancet Respiratory Medicine*. 2022;10(2):149–157. DOI: 10.1016/S2213-2600(21)00369-6
4. Wan ES, Balte P, Schwartz JE, et al. Association between preserved ratio impaired spirometry and clinical outcomes in US adults. *JAMA*. 2021;326(22):2287–2298. DOI: 10.1001/jama.2021.20939
5. Wijnant SRA, de Roos E, Kavousi M, et al. Trajectory and mortality of preserved ratio impaired spirometry: the Rotterdam Study. *European Respiratory Journal*. 2020;55(1):1901217. DOI: 10.1183/13993003.01217-2019
6. Kim J, Lee CH, Lee HY, Kim K. Association between comorbidities and preserved ratio impaired spirometry: using the Korean National Health and Nutrition Examination Survey IV–VI. *Respiration*. 2022;101(1):25–33. DOI: 10.1159/000517599
7. Díez-Manglano J, Asín Samper U. Pulmonary function tests in type 2 diabetes: a meta-analysis. *ERJ Open Research*. 2021;7(1):00371-2020. DOI: 10.1183/23120541.00371-2020
8. Li G, Jankowich MD, Wu L, et al. Preserved ratio impaired spirometry and risks of macrovascular, microvascular complications and mortality among individuals with type 2

diabetes. *Chest*. 2023;164(5):1136–1146. DOI: 10.1016/j.chest.2023.05.031
9. Kaise T, Sakihara E, Tamaki K, Miyata H, Hirahara N, Kirichek O, et al. Prevalence and characteristics of individuals with preserved ratio impaired spirometry and/or impaired lung function in Japan: The OCEAN Study. International Journal of Chronic Obstructive Pulmonary Disease. 2021;16:2665–2675. DOI: 10.2147/COPD.S322041
10. Siddharthan T, Grealis K, Robertson NM, Lu M, Liu S, Pollard SL, et al. Assessing preserved ratio impaired spirometry in low-income and middle-income countries: a cross-sectional study. The Lancet Global Health. 2024;12(9):e1498–e1505. DOI: 10.1016/S2214-109X(24)00233-X
11. Heo IR, Kim HC, Kim TH. Health-related quality of life and related factors in persons with preserved ratio impaired spirometry: data from the Korea National Health and Nutrition Examination Survey. Medicina. 2021;57(1):4. DOI: 10.3390/medicina57010004
12. Shin YY, Shin YY, Park S, Kim KJ, Rhee CK, Yoo KH, Jung KS, Lee JH. Clinical Characteristics and Medical Utilization of Smokers with Preserved Ratio Impaired Spirometry. Int J Chron Obstruct Pulmon Dis. 2023 Oct 6;18:2187-2194. doi: 10.2147/COPD.S425934.
13. Miura S, Iwamoto H, Omori K, Yamaguchi K, Sakamoto S, Horimasu Y, et al. Preserved ratio impaired spirometry with or without restrictive spirometric abnormality. Scientific Reports. 2023;13:2988. DOI: 10.1038/s41598-023-29922-0
14. Zheng J, Zhou R, Zhang Y, Su K, Chen H, Li F, et al. Preserved ratio impaired spirometry in relationship to cardiovascular outcomes: a large prospective cohort study. Chest. 2023;163(3):610–623. DOI: 10.1016/j.chest.2022.11.003
15. Marott JL, Ingebrigtsen TS, Çolak Y, Vestbo J, Lange P. Trajectory of preserved ratio impaired spirometry: natural history and long-term prognosis. American Journal of Respiratory and Critical Care Medicine. 2021;204(8):910–920. DOI: 10.1164/rccm.202102-0517OC

How to cite this article: Kagollu Pradeep kumar, A. Krishna sawarup Reddy, Sreeja Reddy Dyapaa, G.Gopikrishna, K.Prasanna kumar Reddy, PREVALENCE AND CLINICAL CORRELATES OF PRESERVED RATIO IMPAIRED SPIROMETRY AMONG ADULTS ATTENDING A TERTIARY-CARE NON-COMMUNICABLE DISEASE CLINIC, Asian J. Med. Res. Health Sci., 2026; 4 (2):1830-1837.

Source of Support: Nil, Conflicts of Interest: None declared.