EVALUATION OF SIGNIFICANCE OF FEV1/FEV6 WITH FEV1/FVC IN THE DIAGNOSIS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

Dr. Manish Kumar Jain[1*], Dr. Nalin Joshi[2]

1.,2. Associate Professor, Pulmonary Department, NIMS Medical College, Jaipur.

*Corresponding author – **Manish Kumar Jain**
Email id – doctormanishjain2@gmail.com

ABSTRACT

Background: The incidence of COPD has been accounted for approximately 3.5% in India. COPD additionally puts a great deal of additional weight on the pockets of the patients along with additional out of pocket expenditure. It can cost about 30% of the patient's salary on treatment and different issues identified with the COPD. COPD likewise contributes essentially to the disability adjusted life years loss (DALY) in patients. **Material & Methods:** The present prospective study was conducted at department of respiratory medicine of our tertiary care hospital. In present study, we enrolled 100 study participants from outdoor and from ward by simple random sampling, who were presented with signs and symptoms of chronic obstructive pulmonary disease. Clearance from Institutional Ethics Committee was taken before start of study. Written informed consent was taken from each study participant. **Results:** In the present study, Spirometry examination findings of total study participants were recorded. On the basis of the Spirometry examination finding, the mean value of FEV1 (L) was 1.38 ± 0.68, the mean value of FEV6 (L) was 2.17 ± 0.60 and the man value of FVC(L) was 2.24 ± 0.71. on assessment the mean value of FEV1/FVC proportion (postbronchodilator) was 61.6 ± 11.3 and the mean value of FEV1/FEV6 proportion (postbronchodilator) was 63.6 ± 10.99. Out of the total study participants, 88% patients were diagnosed for COPD by using FEV1/FVC proportion of < 70 % and 81% patients were diagnosed for COPD by using FEV1/ FEV6 proportion of < 70 %. **Conclusion:** We concluded from the present study that FEV1/FEV6 proportion is an adequate option to FEV1/FVC proportion in the finding of COPD in patients more than 40 years of age and also who had predisposing factors for COPD.

Keywords: COPD, spirometry, FEV1/FEV6 proportion.

INTRODUCTION

Chronic pulmonary obstructive disease (COPD) has been liable for the diminished quality of life just as expanded grimness and mortality. It has been additionally assessed that in India the prevalence of COPD is approximately around 30 million. All-inclusive it has been assessed that about 3,000,000 people worldwide died because of COPD and bound to possess the third spot of mortality by 2030 **(1)**. The incidence of COPD is reported more in males (5%) as compared to the females (3.2%). The incidence of COPD has been accounted for approximately 3.5% in India. **(2)**. COPD additionally puts a great deal of additional weight on the pockets of the patients along with additional out of pocket expenditure. It can cost about 30% of the patient's salary on treatment and different issues identified with the COPD. COPD likewise contributes essentially to the disability adjusted life years loss (DALY) in patients **(3)**.

COPD additionally has various hazard factors, like an incessant nontransferable sickness. They can be hereditary or natural both and a wide range of hazard

factors assuming their roles. Smoking has been accounted for and discovered to be a significant hazard factor in COPD (4). On the off chance that the patient abstains from smoking, a significant segment of incapacity can be bound to be forestalled in the COPD patients yet, it itself can't clarify the danger of COPD much of the time though being ensnared as the significant hazard factor (5). Different elements like expanding age and female gender represents the danger of COPD. Malnourishment additionally goes about as a hazard factor for COPD. On the off chance that the lung development is affected during fetal life, at that point the kid is inclined to build up the COPD. Rehashed diseases can prompt the advancement of COPD. Having a family ancestry of COPD is a conspicuous hazard factor for the development of the COPD. Congestion additionally favors the COPD. Chronic respiratory diseases in the youth are a significant hazard factor for COPD (6). We conducted the present study to evaluate significance of FEV1/FEV6 with FEV1/FVC in the diagnosis of chronic obstructive pulmonary disease at our tertiary health care centre.

MATERIALS & METHODS

The present prospective study was conducted at department of respiratory medicine of our tertiary care hospital. The study duration was of one. A sample size of 100 was calculated at 90% confidence interval at 5% acceptable margin of error by epi info software version 7.2. Patients were enrolled from outdoor and from ward by simple random sampling. Clearance from Institutional Ethics Committee was taken before start of study. Written informed consent was taken from each study participant.

The data were collected by detailed history of chronic obstructive pulmonary disease, treatment history, general physical and clinical examination from each patient after taking the written consent. All the enrolled study participants were subjected to routine lab investigations including CBC, chest X ray, arterial blood gas analysis, electrolytes and spirometry. Manifestations reminiscent of COPD were exposed to spirometry assessments keeping standard convention of test execution as laid somewhere near ATS/ERS. After exhaustive assessment of the spirometry reports of the patients, those of 100 patients were considered for the examination which satisfied the agreeableness and reproducibility models of test execution. Such spirometry assessments were investigated factually to know the presentation of FEV1/FEV6 proportion

utilizing a cut-off estimation of (postbronchodilator) < 70% subjectively as against FEV1/FVC proportion of (postbronchodilator) < 70% as per GOLD rules for the analysis of chronic obstructive pulmonary disease (7). Patients who were suffering from chronic lung diseases such as ILD or bronchial asthma and active tuberculosis, Patients with or history of congestive cardiac failure were excluded from the present study. Data analysis was carried out using SPSS v22. All tests were done at alpha (level significance) of 5%; means a significant association present if p value was less than 0.05.

RESULTS

In present study, we enrolled 100 study participants from outdoor and from ward by simple random sampling, who were presented with signs and symptoms of chronic obstructive pulmonary disease. The age of study participants was ranged from 18 years to 76 years. The mean age of study participants was 59.4 years. Majority of the study participants 32 % were belonging the age group of 60-70 years which was followed by 28% study participants in the age group of 50-60 years which was followed by 25% study participants in more than 70 years age group followed by 13% study participants in the age group of 30-50 years and 2% study participants were in age group of 18-30 years of age. Out of total study participants it was reported that males 68% were likely affected more than females 32% in the ratio of 2.12 : 1. The mean BMI of study participants was 18.6±3.47. (Table 1)

Table 1: Distribution of study subjects according to the age, gender and BMI.

Study parameters		Number of subjects (%)
Age group	18-30 years	2%
	30-50 years	13%
	50-60 years	28%
	60-70 years	32%
	>70 years	25%
Gender	Male	68%
	Female	32%
BMI (Kg/m2)	18.6±3.47	

In the present study, Spirometry examination findings of total study participants were recorded. On the basis of the Spirometry examination finding, the mean value of FEV1 (L) was 1.38±0.68, the mean value of FEV6 (L) was 2.17±0.60 and the man value of FVC(L) was 2.24±0.71. on assessment the mean value of FEV1/FVC proportion (postbronchodilator) was 61.6 ±11.3 and the mean

value of FEV1/FEV6 proportion (postbronchodilator) was 63.6 ±10.99. (Table 2)

Table 2: Spirometry examination finding wise distribution of study subjects

Study parameters	Mean±SD
FEV1(L)	1.38±0.68
FEV6(L)	2.17±0.60
FVC(L)	2.24±0.71
FEV1/FVC	61.6 ±11.3
FEV1/FEV6	63.6 ±10.99

In the present study, Spirometry examination findings of total study participants were recorded. On the basis of the Spirometry we diagnosed the incidence of COPD by using the presentation of FEV1/FEV6 proportion utilizing a cut-off estimation of (postbronchodilator) < 70% subjectively as against FEV1/FVC proportion of (postbronchodilator) < 70% as per GOLD rules for the analysis of chronic obstructive pulmonary disease. Out of the total study participants, 88% patients were diagnosed for COPD by using FEV1/FVC proportion of < 70 % and 81% patients were diagnosed for COPD by using FEV1/ FEV6 proportion of < 70 %. (Table 3)

Table 3: Distribution of subjects according to symptoms.

Diagnostic method used	Incidence of COPD
FEV1/FVC proportion of < 70 %	88%
FEV1/FEV6 proportion of < 70 %	81%

DISCUSSION

In present study, we enrolled 100 study participants from outdoor and from ward by simple random sampling, who were presented with signs and symptoms of chronic obstructive pulmonary disease. The age of study participants was ranged from 18 years to 76 years. The mean age of study participants was 59.4 years. Majority of the study participants 32 % were belonging the age group of 60-70 years which was followed by 28% study participants in the age group of 50-60 years which was followed by 25% study participants in more than 70 years age group followed by 13% study participants in the age group of 30-50 years and 2% study participants were in age group of 18-30 years of age. Out of total study participants it was reported that males 68% were likely affected more than females 32% in the ratio of 2.12 : 1. The mean BMI of study participants was

18.6±3.47. Similar results were obtained in a study conducted by D Ranganath et al among 229 patients suffering from chronic obstructive pulmonary disease, they included age group 59.0±9.62 years with male preponderance in study population and found similar results to present study (**8**).

In the present study, Spirometry examination findings of total study participants were recorded. On the basis of the Spirometry examination finding, the mean value of FEV1 (L) was 1.38±0.68, the mean value of FEV6(L) was 2.17±0.60 and the man value of FVC(L) was 2.24±0.71. on assessment the mean value of FEV1/FVC proportion (postbronchodilator) was 61.6 ±11.3 and the mean value of FEV1/FEV6 proportion (postbronchodilator) was 63.6 ±10.99. Similar results were obtained in a study conducted by F Rosa et al among patients suffering from chronic obstructive pulmonary disease, they reported Most of the post-BD bends (93.1%) were of generally excellent quality and accomplished evaluation A (762 bends) or B (93 bends). The FEV1/FEV6 and FEV1/FVC proportions were exceptionally related (r(2) = 0.92, P < 0.000). Two recipient administrator trademark bends were developed so as to communicate the unevenness between the affectability and particularity of the FEV1/FEV6 proportion contrasted with two FEV1/FVC cut-off focuses for aviation route impediment: equivalent to 70 (zone under the bend = 0.98, P < 0.0001) and the LLN (territory under the bend = 0.97, P < 0.0001), in the post-BD bends. As per a FEV1/FVC <0.70, the cut-off point for the FEV1/FEV6 proportion with the most noteworthy total for affectability and particularity was 0.75. The FEV1/FEV6 proportion can be viewed as a decent option in contrast to the FEV1/FVC proportion for the analysis of aviation route impediment, both utilizing a fixed cut-off point or underneath the LLN as reference. The FEV1/FEV6 proportion has the extra favorable position of being a simpler move for the subjects and for the lung work professionals, giving a higher reproducibility than conventional spirometry moves(**9**).

In the present study, Spirometry examination findings of total study participants were recorded. On the basis of the Spirometry we diagnosed the incidence of COPD by using the presentation of FEV1/FEV6 proportion utilizing a cut-off estimation of (postbronchodilator) < 70% subjectively as against FEV1/FVC proportion of (postbronchodilator) < 70% as per GOLD rules for the analysis of chronic obstructive pulmonary

disease. Out of the total study participants, 88% patients were diagnosed for COPD by using FEV1/FVC proportion of < 70 % and 81% patients were diagnosed for COPD by using FEV1/ FEV6 proportion of < 70 %. Similar results were obtained in a study conducted by M Hasse et al among patients suffering from chronic obstructive pulmonary disease, they reported mean distinction between FEV1/FEV6% and FEV1/FVC% was 2.7% in the two people. The contrast between the two estimates expanded fairly with expanding age, and was more articulated with smoking and diminishing FEV1/FVC proportion. The incentive for the FEV1/FEV6 proportion which best anticipated a FEV1/FVC proportion of 70%, was 73%, and an awesome understanding was found between these two cut-off qualities (kappa = 0.86) **(10)**.

CONCLUSION

We concluded from the present study that FEV1/FEV6 proportion is an adequate option to FEV1/FVC proportion in the finding of COPD in patients more than 40 years of age and also who had predisposing factors for COPD. The general execution of FEV1/FEV6 proportion is acceptable with satisfactory degrees of affectability and particularity and with positive relationship in correlation with FEV1/FVC. However, for the generalization of present study study results large multicentric studies required with larger sample size.

REFERENCES

1. WHO. Chronic obstructive pulmonary disease (COPD). Available from: https://www.who.int/news-room/fact-sheets/detail/chronic-obstructive-pulmonary-disease-(copd)

2. Koul P. Chronic obstructive pulmonary disease: Indian guidelines and the road ahead. Vol. 30, Lung India. Wolters Kluwer -- Medknow Publications; 2013. p. 175–7. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3775194/

3. Ho T, Cusack RP, Chaudhary N, Satia I, Kurmi OP. Under-and over-diagnosis of COPD: A global perspective. Vol. 15, Breathe. European Respiratory Society; 2019 p. 24–35. Available from: /pmc/articles/PMC6395975/?report=abstract

4. Birring S, Brightling C, Bradding P, Entwisle JJ, Vara DD, Grigg J, et al. Clinical, radiologic, and induced sputum features of chronic obstructive pulmonary disease in nonsmokers: A descriptive study. Am J Respir Crit Care Med. 2002 Oct 15;166(8):1078–83. Available from: https://pubmed.ncbi.nlm.nih.gov/12379551/

5. John F. Devine. Chronic Obstructive Pulmonary Disease: An Overview. Vol. 30, Lung India. Wolters Kluwer -- Medknow Publications; 2013. p. 175–7. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3775194/

6. Qureshi H, Sharafkhaneh A, Hanania NA. Chronic obstructive pulmonary disease exacerbations: Latest evidence and clinical implications. Vol. 5, Therapeutic Advances in Chronic Disease. SAGE Publications; 2014. p. 212–27. Available from: /pmc/articles/PMC4131503/?report=abstract

7. Global Initiative for Chronic Obstructive Lung Disease - Global Initiative for Chronic Obstructive Lung Disease - GOLD. Available from: https://goldcopd.org/

8. Ranganath D, Ravindranath M. Comparison of FEV1/FEV6 with FEV1/FVC in the diagnosis of COPD. Int J Adv Med. 2017;4(5):1304.

9. Rosa FW, Perez-Padilla R, Camelier A, Nascimento OA, Menezes AMB, Jardim JR, et al. Efficacy of the FEV1/FEV6 ratio compared to the FEV1/FVC ratio for the diagnosis of airway obstruction in subjects aged 40 years or over. Vol. 40, Brazilian Journal of Medical and Biological Research. Associacao Brasileira de Divulgacao Cientifica; 2007. p. 1615–21. Available from: https://pubmed.ncbi.nlm.nih.gov/17906778/

10. Melbye H, Medbø A, Crockett A. The FEV1/FEV6 ratio is a good substitute for the FEV1/FVC ratio in the elderly. Prim Care Respir J. 2006 Oct;15(5):294–8. Available from: https://pubmed.ncbi.nlm.nih.gov/16979378/