

Breath of Recovery: Unraveling the Spirometric Secrets of Post-COVID Resilience

The COVID-19 pandemic is the worst ever global health emergency. It has left a significant number of survivors grappling with persistent respiratory symptoms, notably prolonged cough and breathlessness. Spirometry, a fundamental tool in pulmonary function testing, has been instrumental in assessing these post-COVID-19 respiratory impairments.

Studies indicate that 20–60% of COVID-19 survivors experience respiratory symptoms beyond 12 weeks post-infection. Spirometric evaluations have frequently revealed restrictive ventilatory impairments in these individuals, characterized by reduced forced vital capacity (FVC) and normal or elevated forced expiratory volume in one second (FEV1)/FVC ratios. This pattern suggests diminished lung volumes, likely due to parenchymal damage or interstitial changes induced by the virus. Early PFT abnormalities may be due to post-infection interstitial and alveolar injury, and would not be representative of the chronic pulmonary sequelae, considering biological and physiological recovery can occur over months following the acute infection. Additionally, it proposed that patients at risk of pulmonary sequelae can receive their initial PFT at 6 months post-infection with repeat PFT at 6 month intervals (considering the recovery of DLCO defects might only occur 12–18 months post-infection).¹

In Bangladesh, research has mirrored these global findings. A study conducted at Square Hospital in Dhaka assessed 267 post-COVID-19 patients presenting with exertional breathlessness. Spirometric analyses identified restrictive patterns in a significant portion of these patients, underscoring the necessity for comprehensive pulmonary function testing in post-COVID-19 care. In the studied patients, major abnormalities were diffusion defect and reduced volumes (RV, ERV, TLC). So, it is the volume reduction and diffusion membrane defect that leads to dyspnea in these patients.²

Another Bangladeshi study from Bangabandhu Sheikh Mujib Medical University evaluated post-COVID-19

patients three months after discharge. In this study, the characteristic spirometric abnormality was restrictive defect which was more in severe cases. In most of the cases restrictive lung defect was mild. Restrictive lung defect occurs in association with reduced lung volume and reduced DLCO in parenchymal pathology. Frequency of reduced TLC was high and reduced DLCO was the commonest abnormality in this study. It signified the magnitude of residual parenchymal pathology in lung after recovery from acute illness and excluded any explanation of extraparenchymal cause of restrictive lung defect. The results were consistent with results of a systematic review that showed 40% of post COVID-19 patients had reduced DLCO after three months of recovery.³

Beyond restrictive impairments, some post-COVID-19 patients exhibit obstructive patterns on spirometry, indicating airway hyperresponsiveness (AHR). A study assessing respiratory dynamics in post-COVID-19 individuals found that 43.7% experienced AHR, with wheezing being more prevalent. These patients demonstrated significant decreases in pulmonary function test parameters after methacholine challenge tests, highlighting the need for targeted therapeutic strategies.⁴

The clinical implications of these spirometric findings are profound. Persistent respiratory symptoms can substantially impair quality of life, limiting daily activities and increasing healthcare utilization. Early identification of spirometric abnormalities facilitates timely interventions, such as pulmonary rehabilitation and pharmacotherapy, to mitigate long-term respiratory sequelae.

Restrictive impairments may benefit from targeted pulmonary rehabilitation and anti-fibrotic therapies, while obstructive patterns may require bronchodilators and anti-inflammatory treatments. In Bangladesh, as elsewhere, integrating spirometry into post-COVID-19 care protocols is essential to address the respiratory health challenges

posed by this pandemic. This is not just about restoring lung function; it is about restoring lives.

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