IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Correlation Of Physical Activity Level With Dyspnea And Fatigue In Patients With Interstitial Lung Diseases: A Brief Review

Priya Sen[1], Dr. Suman Mehra[2], Dr. Dhruva Chaudhary[3], Ritu Nimbriya[4]

[1]MPT(Cardiopulmonary), College of Physiotherapy, Pt. B.D. Sharma University of Health Sciences, Rohtak, Haryana, India

[2]Associate Professor, College of Physiotherapy, Pt. B.D. Sharma University of Health Sciences, Rohtak, Haryana, India

[3]Sr. Prof. & Head, Department of PCCM, Pt. B. D. Sharma University of Health Sciences, Rohtak, Haryana, India

[4]MPT(Orthopaedics), College of Physiotherapy, Pt. B.D. Sharma University of Health Sciences, Rohtak, Haryana, India

Abstract

Background: Interstitial lung diseases (ILDs) are a broad group of chronic lung disorders that cause symptoms like shortness of breath with exertion, fatigue, and a significant decline in health-related quality of life (HRQoL). ILDs generally begin subtly with symptoms such as dry cough, breathlessness, and crackling sounds in the lungs. The progression of ILDs often linked to inflammation, fibrosis, and irregular wound-healing processes. Due to concerns about worsening lung function or breathlessness during exertion, many ILD patients tend to avoid physical activity, leading to reduced physical activity levels, which in turn heightens the risk of hospitalization and mortality. The restrictions on exercise in ILD patients are influenced by ventilatory limitations, impaired gas exchange, and muscle dysfunction.

Methods: A brief literature review was conducted using the PubMed, Google Scholar, and ResearchGate databases. The research was limited to articles published in English, and a total of 10 relevant trials were included in the review.

Results: Exercise training has shown positive effects on ILD patients, including increased exercise capacity, reduced dyspnoea, and improved HRQoL. Studies demonstrate that both aerobic and resistance training can significantly enhance six-minute walk distance, reduce fatigue, and improve physical endurance in individuals with ILDs.

Conclusion: Exercise training plays a clinically valuable role in managing ILDs, with substantial benefits for physical function and quality of life. Continued research is necessary to refine exercise interventions and better understand their long-term effects on disease outcomes in ILD patients.

INTRODUCTION

The interstitial lung diseases (ILDs) are a diverse group of chronic lung conditions characterised by dyspnoea on exertion and poor health-related quality of life (HRQoL).[1] Idiopathic pulmonary fibrosis is the most common subtype of f-ILDs . However, other ILD subtypes also have a progressive fibrosing phenotype. These include fibrotic hypersensitivity pneumonitis, unclassifiable ILD, non-specific interstitial pneumonia, connective tissue diseases associated ILDs, organizing pneumonia, ILD associated with occupational exposures and rarely sarcoidosis. These conditions typically present with an insidious onset of dry cough, shortness of breath, particularly with progressive exertion, and bibasilar crackles.[2] Such diseases are commonly linked with interstitial inflammation, fibrosis, and abnormal wound healing responses, all of which contribute to disease progression.[3] Many patients with chronic lung disease such as fibrotic ILDs avoid exercise due to a fear of worsening of lung function or dyspnea during exercise. This is of particular concern in ILD since staying physically active is very important.[4] Physical activity is reduced in patients with ILD compared to healthy controls. Greater dyspnea and exercise intolerance are associated with lower physical activity. Reduced physical activity is one of the strong risk factors for hospitalisation and all-cause mortality in patients with ILD.[5] A reduction in physical activity seen in ILD patients is multifactorial, and may initially result from ventilatory limitation, as well as respiratory and psychological symptoms (cough, dyspnea, anxiety and depression) which led to exercise avoidance.[6] Exercise limitation in ILDs is multifactorial, with contributions of impairment of gas exchange and pulmonary circulation, ventilatory limitation, and peripheral muscle dysfunction.[2] Dyspnea is a near-universal finding in people with interstitial lung disease, predominantly due to neuromechanical abnormalities.[7] Dyspnea is considered to contribute to decreased activity of daily living, health related quality of life, exercise capacity, and physical inactivity in ILD.[8] Severe fatigue is highly prevalent in patients with ILD and is associated with dyspnea, depression, catastrophizing, functional activity impairments and quality of life.[9] Exercise training offers promise as a beneficial therapy for patients with ILD, with improvements in six-minute walk distance, dyspnoea, HRQoL and peak exercise capacity.[3] This review aimed to emphasizes the clinical importance of exercise training and calls for further studies to refine treatment strategies and better understand the long-term benefits for ILD patients.

METHODS

Studies were searched from the following ensgine PubMed, Google Scholar, Research Gate databases, Science direct and Cochrane Library using keywords physical activity, dyspnea, fatigue and interstitial lung diseases to review the literature. Ten article were included in the review.

Study Authors, Year & Location	Design	No. of patients/ Mean age (years)	Intervention	Outcome	Outcome measures	Results
Holland AE et al., 2008[1] Australia	RCT	N= 57	EG: Supervised exercise training for 8 weeks CG: Weekly telephone support	-Exercise capacity - Dyspnoea -Fatigue -Quality of life	-6MWD -MRC dyspnoea scale -CRDQ	6MWD, MRC dyspnoea and CRDQ score improved in both the groups. No significant differences found between EG and CG for any of the

						outcomes
Keyser RE et al. 2015[10] USA	Pre-post intervention	N= 13 Mean age= 57.2±9.1 years	Aerobic exercise sessions for 30 minutes per session, 3 times per week for 10 weeks	-Aerobic capacity -physical endurance - severity of fatigue -activity level	-Cardio pulmonary Exercise Testing -6MWT -Fatigue Severity Scale -Human Activity Profile	CPET , 6MWT, FSS and Human Activity Profile shows improved significantly
Tonelli R et al. 2017[11] Italy	Prospective study	N=41 Mean age= 66.9 ± 11 years	ET: 6-h/week 2 session of breathing techniques for 30 min for 4-5 times per week	-Lung function and volumes -exercise capacity - dyspnea -quality of life -fatigue	-Lung function tests -incremental and endurance cyclo-ergometry, 6MWD -MRC dyspnea scale, -SGRQ -Borg scale	Exercise performance, symptoms, fatigue, SGRQ and MRC significantly improved after ET.
Essam H et al. 2022[2] Egypt	Case-control study	N=31 LL endurance training= 10 Mean age= 44.4±12.25 years ULB= 10 41.90±7.58 years CG= 11	ET: 6-week program, 3 sessions/week (18 total)	-Exercise Testing -Dyspnea -quality of life -Functional lung capacity	-Cardio pulmonary Exercise Testing, 6MWD -mMRC Dyspnea Scale -SGRQ -Forced Spirometry	FEV1% Significant improvement in FEV1%, SpO2, 6MWD and dyspnea. Peak oxygen consumption imp roved in both groups. no significant differences between both groups regarding 6-MWT, SGRQ or CPET parameters
Bogerd	RCT	N=60	60 sessions, 3	-Functional	-6MWD	Significant

SP et al. 2018[12] Belgium		Mean age= 64 ± 11 years EG= 30 CG= 30	times per week for the first 3 months and thereafter twice weekly	lung capacity -exercise capacity -Quality of Life -Dyspnea	-Forced Vital Capacity, Quadriceps Force -SGRQ, CRDQ -MRC dyspnea scale	improvements in 6MWD, exercise capacity, quadriceps force, and health status compared to usual care. Slight improvement in forced vital capacity.
Dowman LM et al. 2017[3] Australia	RCT	N=142 EG= 74 CG= 68	ET: 8 weeks of supervised exercise sessions CG: Usual care without ET	-Exercise Capacity - Quality of Life -Dyspnoea	-6MWD -CRDQ and SGRQ-I -mMRC dyspnoea scale	ET significantly improved 6MWD, exercise capacity, Quality of Life, and dyspnoea
Morino A et al. 2017[13] Japan	Observational cross-sectional study	N=38 Mean years=71.3 ±8.4 years	---	-Exercise capacity -Pulmonary function capacity - Physical function -dyspnea -Daily physical activity	-6MWD -pulmonary function tests -MRC Dyspnea scale -Quadriceps muscle force by hand-held dynamometer -accelerometer	Daily physical activity is the strongest factor affecting exercise capacity in IPF patients. Pulmonary function and muscle strength also contribute, but to a lesser extent.
Kaushal M et al. 2019[14] India	Prospective quasi-experimental study	N=25 mean age= 63.28 ± 10.88 years	ET: 60 minutes of session thrice weekly for 8 weeks	-Exercise capacity -Respiratory muscle pressure -dyspnea	-6MWT -respiratory pressure meter -MRC Dyspnea scale -Borg scale, and spirometry	Significant improvement in the mean 6MWT distance, inspiratory muscle pressure, and dyspnea. Change in spirometry values was non-significant.

Brunetti G et al. 2021[15] Italy	Retrospective study	N=240 Mean age= 71 ± 8.73 years	ET: 2 sessions per day, 5 times per week for 3-4 weeks	-Dyspnea -exercise capacity -leg fatigue	-mMRC dyspnea scale - 6MWT -Borg Dyspnoea and Leg Fatigue Scales	Pulmonary rehabilitation may improve dyspnoea, exercise capacity and fatigue in patients with ILD of different aethiologies and level of severity.
Sikora M et al. 2023[16] Poland	RCT	N= 68 EG= 52 mean age= 60.9 ± 10.8 years CG= 16 mean age= 60.9 ± 10.8 years	Walking on a flat surface as far as possible	- Quality of Life -Dyspnea -fatigue -Physical Functioning and Activity -lung function	-SF-36 -MRC Dyspnea scale, -Fatigue assessment scale -6MWD and accelerometer -spirometry	Physical performance significantly impact quality of life decline in ILD patients. IPF patients exhibit lower PA compared to other ILD and sarcoidosis patients.

ILD= Interstitial lung diseases, RCT= Randomised control trial, ET= Exercise training, CG= Control group, 6MWD= 6 minute walking distance, SGRQ= St. George's Respiratory Questionnaire

CONCLUSION

Interstitial lung disease (ILD) adversely impacts physical fitness, lung function, and quality of life, even in its early stages, underscoring the importance of early diagnosis and timely management. This review highlights that increasing physical activity levels through daily walking, low-intensity movements, or structured routines can significantly improve exercise capacity, reduce dyspnea and fatigue, and enhance health-related quality of life in ILD patients. Maintaining regular physical activity not only supports better pulmonary and muscular function but also contributes positively to mental well-being by alleviating symptoms of anxiety and depression.

While physical activity is beneficial across various ILD types, the extent of improvement may vary based on disease severity. Moreover, there is limited evidence on the long-term impact of physical activity interventions, indicating a need for further research to establish sustainable and effective activity-based strategies. Importantly, the review underscores a clear relationship between increased physical activity and reductions in dyspnea and fatigue.

Incorporating and promoting regular physical activity as a core element of ILD care can help slow disease progression, preserve independence, and improve overall patient outcomes. Future studies should focus on optimizing physical activity recommendations tailored to individual capabilities and disease stages.

DECLARATIONS

Funding: No funding resources

Conflict of interest: Not declared

Ethical approval: Not required

REFERENCES

1. Holland AE, Hill CJ, Conron M, Munro P, McDonald CF. Short term improvement in exercise capacity and symptoms following exercise training in interstitial lung disease. Thorax. 2008 Jun 1;63(6):549-54.
2. Essam H, Abdel Wahab NH, Younis G, El-Sayed E, Shafiek H. Effects of different exercise training programs on the functional performance in fibrosing interstitial lung diseases: A randomized trial. Plos one. 2022 May 26;17(5).
3. Dowman LM, McDonald CF, Hill CJ, Lee AL, Barker K, Boote C, Glaspole I, Goh NS, Southcott AM, Burge AT, Gillies R. The evidence of benefits of exercise training in interstitial lung disease: a randomised controlled trial. Thorax. 2017 Jul 1;72(7):610-9.
4. Veit T, Barnikel M, Kneidinger N, Munker D, Arnold P, Barton J, Crispin A, Milger K, Behr J, Neurohr C, Leuschner G. Clinical impact of physical activity and cough on disease progression in fibrotic interstitial lung disease. Journal of Clinical Medicine. 2023 May 31;12(11):3787.
5. Hur SA, Guler SA, Khalil N, Camp PG, Guenette JA, Swigris Jj et.al. "Minimal important difference for physical activity and validity of the international physical activity questionnaire in interstitial lung disease." Annals of the American Thoracic Society. Ann Am Thorac Soc. 2015; 1:107-15.
6. Aronson KI, Suzuki A. "Health related quality of life in interstitial lung disease: can we use the same concepts around the world?" Front Med. 2021; 8:2-9.
7. Collard HR, Pantilat SZ. "Dyspnea in interstitial lung disease. Current opinion in supportive and palliative care". 2008;2(2):100-04.
8. Hanada M, Tanaka T, Kozu R, Ishimatsu Y, Sakamoto N, Orchanian-Cheff A et al. "The interplay of physical and cognitive function in rehabilitation of interstitial lung disease patients: a narrative review." J Thorac Dis. 2023;15(8):4503-21.
9. Bloem AE, Mostard RL, Stoot N, Vercoulen JH, Peters JB, Janssen DJ et al. "Severe fatigue is highly prevalent in patients with IPF or sarcoidosis." J Clin Med. 2020;9(4):1-16.
10. Keyser RE, Christensen EJ, Chin LM, Woolstenhulme JG, Drinkard B, Quinn A, Connors G, Weir NA, Nathan SD, Chan LE. Changes in fatigability following intense aerobic exercise training in patients with interstitial lung disease. Respiratory medicine. 2015 Apr 1;109(4):517-25.
11. Tonelli R, Cocconcelli E, Lanini B, Romagnoli I, Florini F, Castaniere I, Andrisani D, Cerri S, Luppi F, Fantini R, Marchioni A. Effectiveness of pulmonary rehabilitation in patients with interstitial lung disease of different etiology: a multicenter prospective study. BMC pulmonary medicine. 2017 Dec;17:1-9.
12. Perez-Bogerd S, Wuyts W, Barbier V, Demeyer H, Van Muylem A, Janssens W, Troosters T. Short and long-term effects of pulmonary rehabilitation in interstitial lung diseases: a randomised controlled trial. Respiratory research. 2018 Dec;19:1-0.
13. Morino A, Takahashi H, Chiba H, Ishiai S. Daily physical activity affects exercise capacity in patients with idiopathic pulmonary fibrosis. Journal of Physical Therapy Science. 2017;29(8):1323-8.
14. Kaushal M, Shad Ali M, Kumar Sharma R, Talwar D. Effect of respiratory muscle training and pulmonary rehabilitation on exercise capacity in patients with interstitial lung disease: A prospective quasi-experimental study. Eurasian journal of pulmonology. 2019;21(2):87.
15. Brunetti G, Malovini A, Maniscalco M, Balestrino A, Carone M, Visca D, Capelli A, Vitacca M, Bellazzi R, Piaggi G, Fuschillo S. Pulmonary rehabilitation in patients with interstitial lung diseases: Correlates of success. Respiratory Medicine. 2021;185:106473.
16. Sikora M, Jastrzębski D, Pilzak K, Ziora D, Hall B, Żebrowska A. Impact of physical functional capacity on quality of life in patients with interstitial lung diseases. Respiratory Physiology & Neurobiology. 2023 Jul 1;313:104064.