IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

EFFECT OF INCOPORATING BALANCE TRAINING IN PULMONARY REHABILITATION ON FUNCTIONAL CAPACITY AND QUALITY OF LIFE IN PATIENTS WITH CHRONIC LUNG DISEASES

[1]Jinaishi Kotecha, [2]Poonam Parulekar, [3]Orein Fernandes

[1]Post Graduate Student, Department of Physiotherapy
SVKM's NMIMS (Deemed to be University) Sunandan Divatia School of Science, Vile Parle (West), Mumbai 400056, India

[2]Assistant Professor, Department of Physiotherapy
SVKM's NMIMS (Deemed to be University) Sunandan Divatia School of Science, Vile Parle (West), Mumbai 400056, India

[3]Assistant Professor, Department of Physiotherapy
SVKM's NMIMS (Deemed to be University) Sunandan Divatia School of Science, Vile Parle (West), Mumbai 400056, India

Abstract: Chronic respiratory diseases (CRDs) are a major cause of morbidity and mortality for patients and health systems worldwide. In 2017, 545 million individuals were predicted to be affected by a CRD, resulting in 3.9 million deaths. Dyspnea, tiredness, worries, depression, and fear are just a few of the debilitating symptoms associated with chronic respiratory disorders (CRDs). They also impair people's quality of life, increase the risk of hospitalization and mortality, and make it more difficult for them to exercise and perform daily duties. The collective illnesses known as chronic respiratory diseases (CRD) include asthma, interstitial lung disease (ILD), pulmonary sarcoidosis, pneumoconiosis, asthma, and chronic obstructive pulmonary disease (COPD).

Index terms*:* chronic respiratory diseases, breathing exercises, pulmonary rehabilitation, aerobic exercises, strength training, quality of life, functional capacity

I.INTRODUCTION

Asthma, pneumoconiosis, pulmonary sarcoidosis, interstitial lung disease (ILD), asthma, and chronic obstructive pulmonary disease (COPD) are among the illnesses together referred to as chronic respiratory diseases (CRD). As the third most common cause of death worldwide in 2019,CRD carries a substantial burden and cost[(2)].According to American thoracic society (ATS) recent guidelines 2023, Pulmonary rehabilitation (PR) is ―a comprehensive intervention based on a thorough patient assessment followed by patient-tailored therapies that include, but are not limited to, exercise training, education, and behavior change, designed to improve the physical and psychological condition of people with CRD and to promote the long-term adherence to health enhancing behaviors. PR is an essential component of the integrated care of people with CRD. Core components of PR include structured and progressive individually tailored exercise training, self-management education, patient assessment, and outcomes measurement (3–5) delivered by a multidisciplinary team of healthcare professionals (HCPs). Participation in PR reduces dyspnea; increases exercise capacity; improves health-related quality of life (HRQoL) and emotional function; confers social support; and, for those with chronic obstructive pulmonary disease (COPD), reduces hospital admissions and

mortality risk after hospitalization. Respiratory discomfort and increasing airflow limitation are symptoms of the respiratory illness COPD. Patients with COPD experience weight loss, peripheral muscle dysfunction, systemic inflammation, psychosocial issues, and cardiovascular comorbidities in addition to the pulmonary pathology. Individuals with COPD have been shown to have decreased functional mobility, exercise capacity, and peripheral muscle performance; however, new research indicates that these individuals also exhibit a significant loss in balance control. One of the main causes of morbidity and death among the elderly is falls. The risk of falling rises with age, with one in three community-dwelling individuals 65 years of age or older experiencing at least one falls annually. Falls have a substantial negative social and financial impact on people, their families, the economy, and community health services. Exercise interventions have been shown in a Cochrane systematic review to lower the rates of falls (number of falls per person) and the risk of falling (percentage of persons having one or more falls) among older adults living in the community. Moreover, implementing exercise as a stand-alone intervention may be the best and maybe most economical way to prevent falls at the population level, as it has a fall prevention effect comparable to that of multimodal interventions [(10)].

II.**AIM:**

To assess the effect of balance training in adjunct to aerobic exercises on functional capacity and quality of life in patients with chronic respiratory diseases (CRD).

III. OBJECTIVES: To assess the effect of balance training as an adjunct to conventional pulmonary rehabilitation on

1. MINI-BESTest
2. Vital capacity using volumetric spirometer
3. Peak expiratory flow rate (PEFR)
4. Chronic Respiratory Disease Questionnaire (CRQ-SAS)

IV. METHODOLOGY:

1. Study Design: Interventional Study
2. Study Population: Patients diagnosed with chronic respiratory disease by pulmonologist
3. Sampling Method: Convenience sampling
4. Study Duration: 1 year
5. Duration Of Data Collection: 6 months
6. Sampling Calculation: G-power
7. Sample Size: 40 (20 in each group)
8. Inclusion Criteria: Patients who have been diagnosed with chronic respiratory disease (CRD) by pulmonologist and are referred for pulmonary rehabilitation.
9. Exclusion Criteria:
   - Presence of any comorbidities that affects balance of patients
   - Presence of any other recent musculoskeletal, neurological or cardiovascular disease injuries affecting participation in the study
10. CTRI Registration Number: CTRI/2023/10/073967
11. Ethical Approval Number: BNH/0794/2023

12. Outcome Measures:
    - MINI-BESTest
    - Vital capacity using volumetric spirometer
    - Peak expiratory flow rate (PEFR)
    - Chronic Respiratory Disease Questionnaire (CRQ-SAS)
13. Procedure: Institutional Ethical Board approval was obtained. Clinical Trials Registration was done. Participants were selected according to inclusion and exclusion criteria. Demographic data was taken, and outcome measures were assessed. Participants were divided into 2 groups: Conventional group (n=20): all the participants in this group performed conventional pulmonary rehabilitation. Interventional group (n=20): all the participants in this group performed conventional pulmonary rehabilitation along with balance training. After completion of 12th session participants were reassessed and scores were noted.

Conventional program- According to ATS guidelines the program was planned

Interventional program –

All exercises were performed on different surfaces like stability trainers, mat, swiss ball.

V. RESULTS:

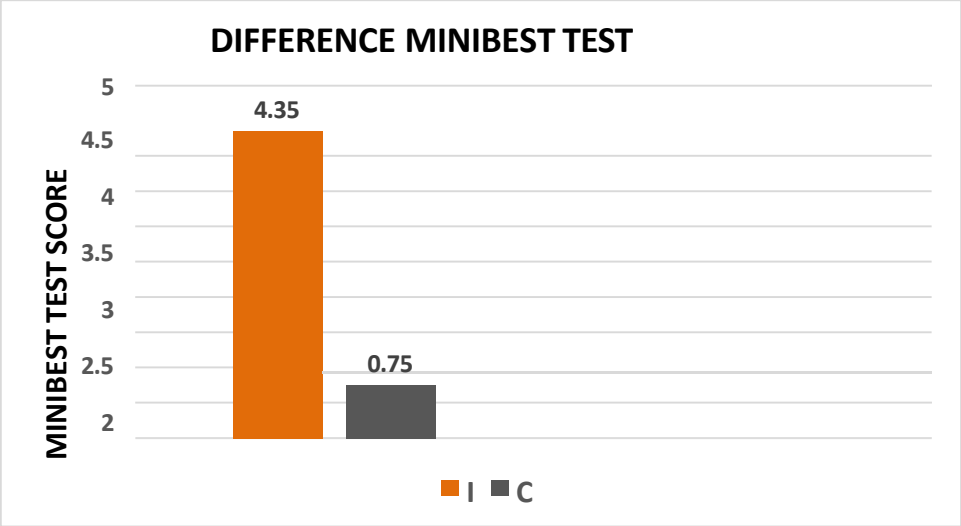
All the results were recorded and analyzed by using Statistical Package of Social Science (SPSS) software version 29. The intragroup data was analyzed using Paired t-test. The intergroup data was analyzed using an Independent t-test. The result was concluded to be statistically significant with $p<0.05$.

Table no.1 Demographic data

	Control Group	Interventional Group
Gender	8:12	9:11
Age	67.2(±71.90)	67.05(±71.51)

Table no. 2 Denoting difference in intervention and control group of MINIBESTEST

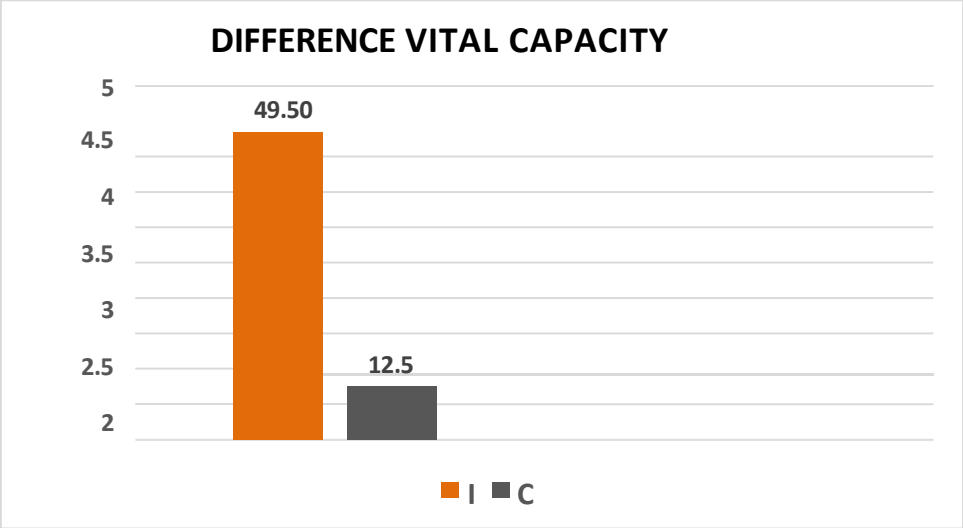
Difference	CONTROL	INTERVENTION	p-value
	0.75(±1.446)	4.35(±2.621)	<0.001



Graph no. 1 Difference in IG and CG of MINIBESTest

Table no. 3 Denoting difference in intervention and control group of VC

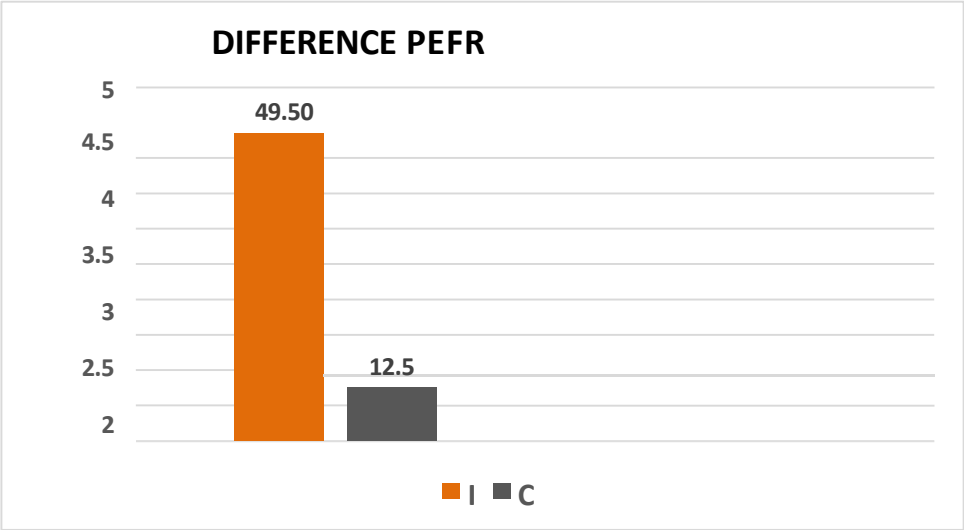
Difference	CONTROL	INTERVENTION	p-value
	12.50(±22.213)	49.50(±40.062)	<0.001



Graph no.2 Difference in IG and CG of vital capacity

Table no. 4 Denoting difference in intervention and control group of PEFR

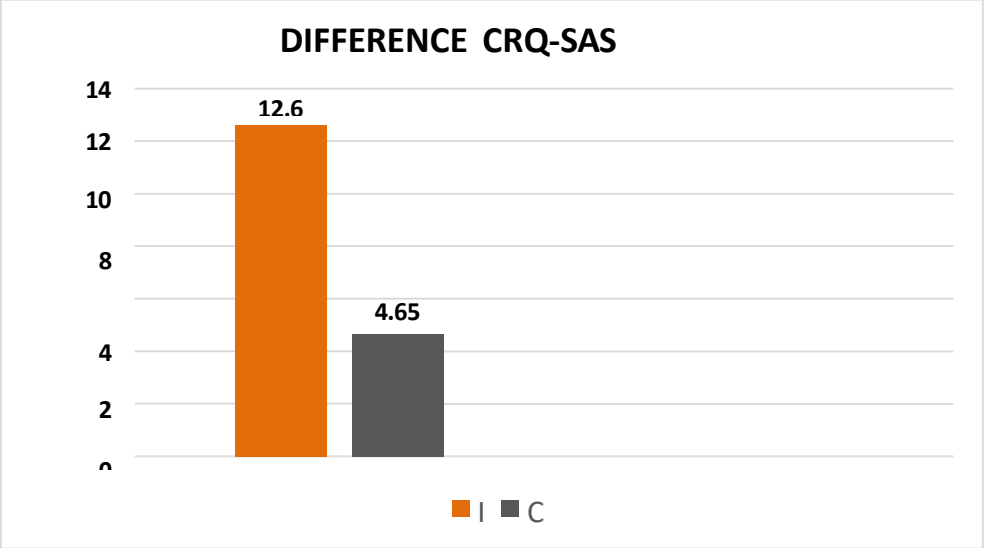
	CONTROL	INTERVENTION	p-value
Difference	12.50(±22.213)	49.50(±40.062)	<0.001



Graph no.3 Difference in IG and CG of PEFR

Table no. 5 denoting difference in intervention and control group of CRQ-SAS

	CONTROL	INTERVENTION	p-value
Difference	4.65(±3.54)	12.60(±4.99)	<0.001



Graph no.4 Difference in IG and CG of CRQ-SAS

VI. DISCUSSION:

The patients in interventional group were given the breathing exercises and aerobic exercises on different surfaces, starting with stable surface then progressing to unstable surfaces like stability trainer, gym ball. The link between the proprioception system and the sensory-motor system produces postural regulation. The proprioception system helps maintain balance during stance and is a significant source of sensory feedback. Strength and balance exercises should be part of an aged person's balance training regimen. Moderate to severe balance issues should accompany balance improvement programs. It is possible to provide a moderate to severe challenge for balance by decreasing the base of support and weight transfer.

VII.CONCLUSION:

There was statistically significant difference seen in pre and post values of MINIBESTest, vital capacity, PEFR, CRQ-SAS of IG.

There was statistically significant difference seen in pre and post values of MINIBESTest, vital capacity, PEFR, CRQ-SAS of CG.

There was no statistically significant difference seen between both the groups. However, when the differences in improvements of both the groups were compared IG showed a statistically increase in all the outcome measures as compared to CG.

VIII. REFERENCES:

1) Rochester CL, Alison JA
Pulmonary Rehabilitation for Adults with Chronic Respiratory Disease: An Official American Thoracic Society Clinical Practice Guideline. Am J Respir Crit Care Med. 2023 Aug 15

2) GBD 2019 Chronic Respiratory Diseases Collaborators. Global burden of chronic respiratory diseases and risk factors, 1990-2019: an update from the Global Burden of Disease Study 2019. EClinicalMedicine. 2023 May.

3) Daniel, Roy Arokiam1; Aggarwal,
Prevalence of chronic obstructive pulmonary disease in India: A systematic review and meta-analysis. Lung India Nov–Dec 2021.

4) Kumar P, Ram U. Patterns

Factors associated and morbidity burden of asthma in India. PLoS One. 2017 Oct.

5) Singh, Virendra; Sharma, Bharat Bhushan1.

Respiratory disease burden in India: Indian chest society SWORD survey. Lung India 35(6):p 459-460, Nov–Dec 2018.

6) Dowman L, Hill CJ, May A, Holland AE.

Pulmonary rehabilitation for interstitial lung disease. Cochrane Database Syst Rev. 2021 Feb 1;2(2):CD006322. doi: 10.1002/14651858.CD006322.pub4. PMID: 34559419; PMCID: PMC8094410.

7) Spruit MA, Singh SJ, ATS/ERS Task Force on Pulmonary Rehabilitation. An official American Thoracic Society/European Respiratory Society statement: key concepts and advances in pulmonary rehabilitation. Am J Respir Crit Care Med. 2013 Oct.Rabinovich RA, Vilaró J.

Structural and functional changes of peripheral muscles in chronic obstructive pulmonary disease patients. Curr Opin Pulm Med. 2010 Mar..

8) Sherrington C, Michaleff ZA

Exercise to prevent falls in older adults: an updated systematic review and meta- analysis. Br J Sports Med. 2017 Dec;51(24):1750-1758. doi: 10.1136/bjsports- 2016-096547. Epub 2016 Oct 4. PMID: 27707740.

9) Daniel, Roy Arokiam1; Aggarwal, Praveen;

Prevalence of chronic obstructive pulmonary disease in India: A systematic review and meta-analysis. Lung India 38(6):p 506-513, Nov–Dec 2021. | DOI: 10.4103/lungindia.lungindia_159_21

10) Crişan AF, Oancea C

Balance impairment in patients with COPD. PLoS One. 2015 Mar 13;10(3):e0120573. doi: 10.1371/journal.pone.0120573. PMID: 25768731; PMCID: PMC4358954.

11) Lesinski M, Hortobágyi T

Effects of Balance Training on Balance Performance in Healthy Older Adults: A Systematic Review and Meta-analysis. Sports Med. 2015 Dec;45(12):1721-38. doi: 10.1007/s40279-015-0375-y. Erratum in: Sports Med. 2016 Mar;46(3):457. PMID: 26325622; PMCID: PMC4656699.

12) He W, Wang J

Effects of exercise-based pulmonary rehabilitation on severe/very severe COPD: a systematic review and meta-analysis. Ther Adv Respir Dis. 2023 Jan- Dec;17:17534666231162250. doi: 10.1177/17534666231162250. PMID: 36946384; PMCID: PMC10037727.

13) McCarthy B, Casey D

Pulmonary rehabilitation for chronic obstructive pulmonary disease. Cochrane DatabaseSystRev.2015Feb doi: 10.1002/14651858.CD003793.pub3. PMID: 25705944; PMCID: PMC10008021.