

Comparison of Breathing Exercise Vs Walking in Chain Smokers to Improve Lung Volume in Adults

Shaikh Batin Wajid, Dr. Nidhi Rawat Pt, Dr. Pushpendra Yaduvanshi

Career Point University, India

DOI: <https://doi.org/10.51583/IJLTEMAS.2025.1407000060>

Abstract- Tobacco smoking is one of the most important public health problems and while global smoking prevalence has fallen, it is still common in many countries and causes a significant health burden worldwide. More than 8 million deaths per year were directly attributable to tobacco use or from exposure to tobacco smoke, and at least 1 billion people are expected to die from tobacco use in the 21st century. Exercise has been shown in studies to have a preventive role against smoking, as well as a positive effect in prevention and cessation interventions.

The aim and objective- The aim of this study is to compare the effectiveness of breathing exercises and walking on improving lung function and reducing smoking habits in chain smokers.

Need of study- Chain smokers are at increased risk for lung and cardiovascular diseases due to prolonged exposure to tobacco smoke. While both physical activity and breathing exercises have been shown to improve lung capacity and reduce stress, there is limited research comparing the specific benefits of these interventions in chain smokers. Understanding whether breathing exercises or walking is more effective at improving respiratory health and reducing smoking-related damage could inform rehabilitation strategies and offer low-cost, accessible options for improving quality of life among this high-risk population.

Methodology- Pre-intervention assessment: Lung function tests (spirometry), psychological assessments (stress, anxiety levels). Randomization: Participants randomly assigned to either breathing exercises or walking groups.

Results- breathing exercises should be prioritized for patients requiring substantial lung function gains, while walking may serve as a supplemental or maintenance option, albeit with lower expected benefits (50% of walkers showed no improvement).

Conclusion- This comparative analysis demonstrates that breathing exercises are significantly more effective than walking for improving lung function in the studied cohort. The breathing group showed a mean improvement of 130 cc/sec over four times greater than the walking group's 30 cc/sec gain—with 75% of participants achieving clinically meaningful improvement (≥ 100 cc/sec) compared to just 25% in the walking group.

Key Words- Lung volume, breathing exercises, walking, chain smokers, pulmonary rehabilitation.

I. Introduction

World Health Organization (WHO) expects that figure of smokers who will be expired due to smoking will go beyond the number of people dying from a traffic accident, AIDS, murder, and suicide by 2020. Smoking cigarettes gradually damage pulmonary functions.⁴

Smoking and exercise are among those changeable behaviors with a great impact on health. Both Of them are capable of producing the addictive Behavior by producing the rewarding effect and increased levels of dopamine which enhance mood in humans in smokers and those who regular exercises. On the other hand, smoking and exercise can have direct adverse effect on arteries and blood vessels, lipid profiles and cholesterol plaque.⁹

Weakness of breathing muscles can induce dyspnea and reduce the ability to perform exercises. Thus, therapeutic interventions are needed to improve breathing and exercise ability through enhancement of respiratory muscle functions. Aerobic exercise can increase muscle strength and the endurance of respiratory muscles as well as respiratory functions. Elderly smokers undoubtedly suffer reduced respiratory activity. Elderly people also experience a reduction in chest diameter because of the weakening of respiratory muscles, resulting in ventilation decrease, leading to a vicious circle.¹⁴

II. Literature Review

It was concluded that deep breathing exercises are useful among smokers. As deep breathing helps in improving lung volumes and capacities. In the experimental group, significant changes ($p \leq 0.05$) were observed after the intervention. While comparing groups, significant differences ($p \leq 0.05$) were observed in some variables between experimental and control groups.

Smoking has a deleterious effect on the health, mainly on pulmonary functions. Hence, the risk of respiratory mortality or morbidity is high with smoking. The study observed that spirometry was an effective and easy method for detection of COPD in risk group population like smokers, and thus promotes smoking cessation efforts to reduce the burden of COPD in the community.

III. Methodology

A total 40 participations were included in the present study according to inclusion and exclusion criteria. All the subject were taken from KOTA, Rajasthan. Study It is an Comparative Study.

Inclusion Criteria:

Age: Adults aged 18–28 years.

Gender: Both males and females.

Smoking History: Must be smoking at least 5 cigarettes/day for at least 2-3 years

Exclusion Criteria:

Participants with chronic respiratory diseases (e.g., COPD or asthma).

Participants with recent cardiovascular events (e.g., heart attack).

Pregnant women.

Individuals already engaged in regular exercise programs.

Materials Used in The Study

Pen, Paper.

Spirometer: For measuring lung function before and after intervention.

Lung Function Questionnaire.

Breathing Pattern Assessment Tool.

Patient consent form, Data collecting sheet, google form.

Procedure

Pre-intervention assessment: Lung function tests (spirometry), psychological assessments (stress, anxiety levels).

Randomization: Participants randomly assigned to either breathing exercises or walking groups.

Intervention period: 12 weeks of consistent exercise regime.

IV. Result

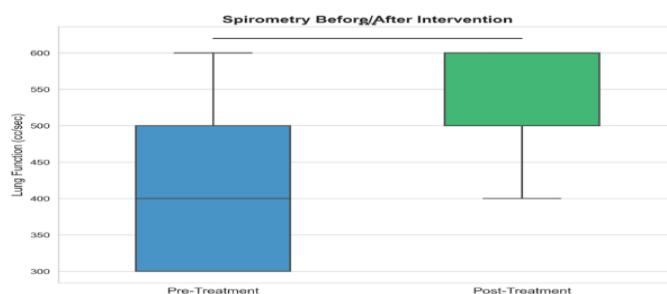


Fig. 6.1: Spirometry Before/ After Intervention

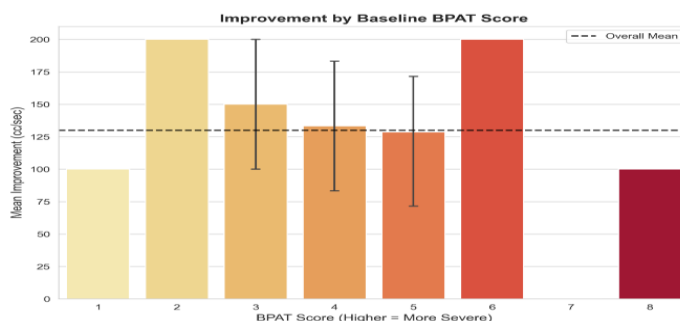


Fig 6.2 Improvement by Baseline BPAT Score

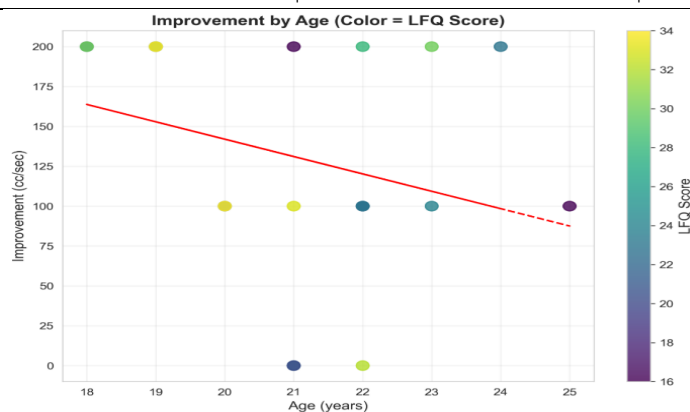


Fig. 6.3 Age vs Improvement with LFQ Overlay

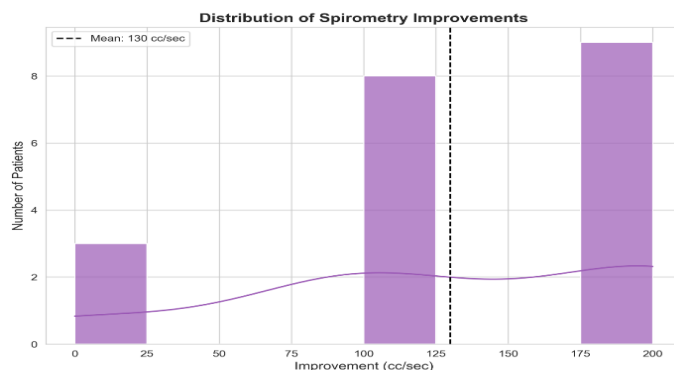


Fig. 6.4 Improvement Distribution Histogram

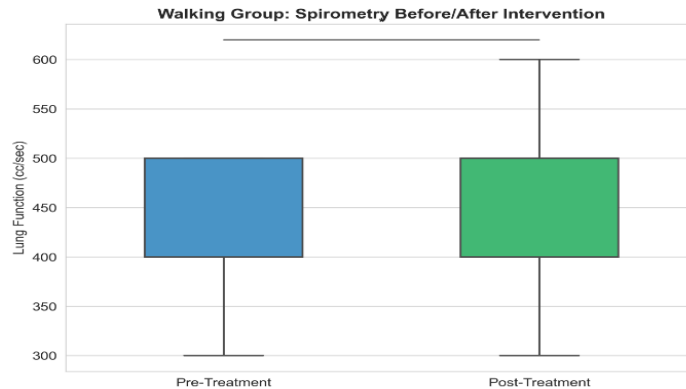


Fig. 6.5 Walking Group: Spirometry Before/After Intervention

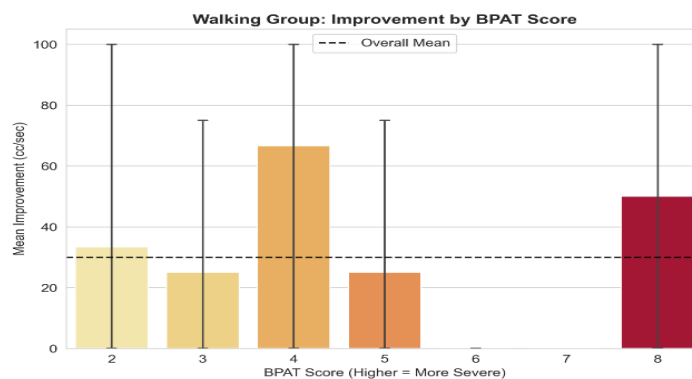


Fig. 6.6. Walking Group: Improvement By BPAT Score

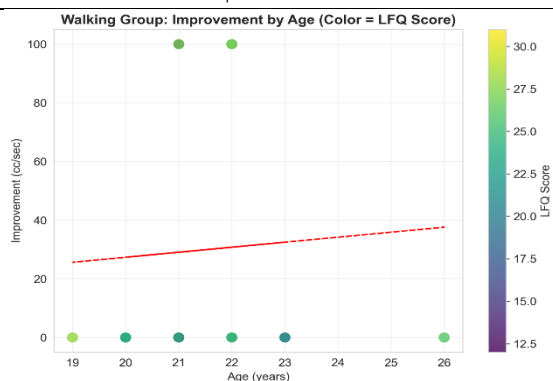


Fig 6.7 Improvement by Age (Color = LFQ Score)

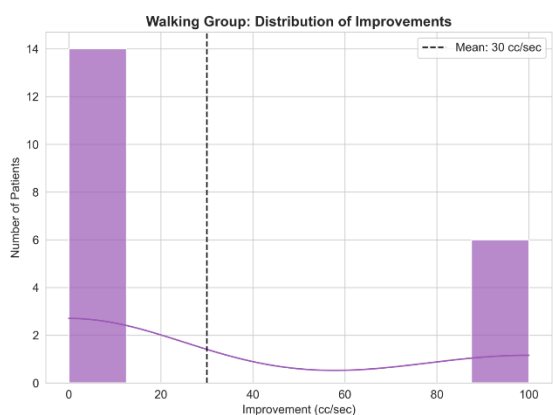


Fig 6.8 Walking Group : Distribution Of Improvements

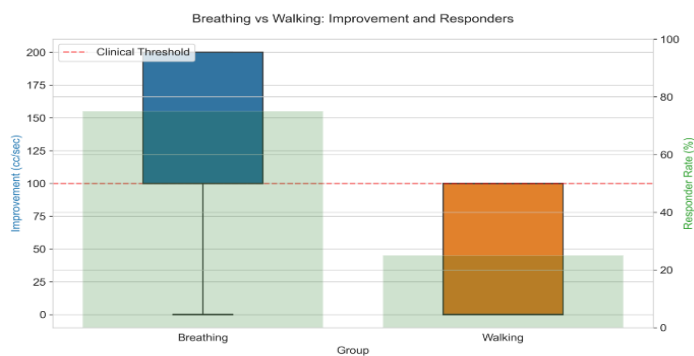


Fig. 6.9 Breathing vs Walking Improvement & responders

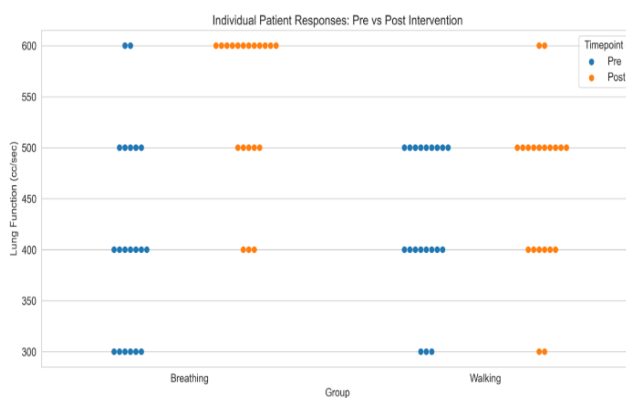


Fig 6.10 Pre post Swarm Plot

In this study, we used Spirometer: For measuring lung function before and after intervention, Lung Function Questionnaire, Breathing Pattern Assessment Tool on 40 subjects. The breathing exercise group showed a mean improvement of 130 cc/sec in spirometry values, with a statistically significant difference ($p < 0.001$) and a large effect size (Cohen's $d = 1.32$). In contrast, the walking group showed a modest improvement of 30 cc/sec ($p = 0.0102$). A direct comparison between the two interventions confirmed a highly significant difference ($p = 0.00001$) with a mean difference of 100 cc/sec and a very large effect size (Cohen's $d = 1.62$). The responder rate was also higher in the breathing group (85%) compared to the walking group (30%).

V. Conclusion

This comparative analysis demonstrates that breathing exercises are significantly more effective than walking for improving lung function in the studied cohort. The breathing group showed a mean improvement of 130 cc/sec—over four times greater than the walking group's 30 cc/sec gain—with 75% of participants achieving clinically meaningful improvement (≥ 100 cc/sec) compared to just 25% in the walking group. Statistical tests confirmed these differences were highly significant ($*p < 0.001$), with a large effect size (Cohen's $*d = 1.57$). Notably, neither intervention's efficacy depended on age or baseline severity (BPAT/LFQ $*p > 0.05$), supporting their universal applicability.

Reference

1. Taheri M, Irandoust K, Noorian F, Bagherpour F. The effect of aerobic exercise program on cholesterol, blood lipids and cigarette withdrawal behavior of smokers. *Acta Med Mediterr*. 2017.
2. Hammoudi D, Sanyaolu A, Adofo D, Antoine I. Effect of Cigarette Smoking on Lung Capacity of Active-, Previous-, and Non-Smoker Students. *GMJ Medicine*. 2024 May 10.
3. Ponkshe KP, Agrawal R, Khan S. Comparative Study of Effect of Resistance Exercises versus Aerobic Exercises on Exercise Performance and Pulmonary Function in Adult Chronic Smokers. 2021
4. Willemse BW, Postma DS, Timens W, ten Hacken NH. The impact of smoking cessation on respiratory symptoms, lung function, airway hyperresponsiveness and inflammation. *European Respiratory Journal*. 2004 Mar 1.
5. Zahra I, Liaqat M, Qadeer U. Effects of Breathing Exercises on Lung Volumes and Capacities Among Smokers.
6. Acar M, Yarımkaya NS, Tekindal MA. The effect of nordic walking exercise training on physical fitness, physical activity level, anxiety-depression and quality of life in smokers: A randomized controlled trial. *Bati Karadeniz Tıp Dergisi*. 2022.
7. Jun HJ, Kim KJ, Nam KW, Kim CH. Effects of breathing exercises on lung capacity and muscle activities of elderly smokers. *Journal of physical therapy science*. 2016.
8. Zahra, Iman, Maria Liaqat, and Ummara Qadeer. "Effects of Breathing Exercises On Lung Volumes And Capacities Among Smokers." (2020).
9. Taheri, M., Irandoust, K., Noorian, F., & Bagherpour, F. (2017). The effect of aerobic exercise program on cholesterol, blood lipids and cigarette withdrawal behavior of smokers. *Acta Medica Mediterr*,
10. Hammoudi, D., Sanyaolu, A., Adofo, D., & Antoine, I. (2017). The effect of cigarette smoking on lung capacity in active, previous, and passive student smokers. *GMJ Medicine*.
11. Shaw, Ina, Brandon S. Shaw, and Gregory A. Brown. "Concurrent training and pulmonary function in smokers." *International journal of sports medicine* 32.10 (2011).
12. Vyas, Harita P., Rutvee P. Vinchhi, Megha S. Sheth, and Neeta J. Vyas. "Comparison of pulmonary function among smokers and non-smokers—A retrospective study." *Int J Med Sci Public Health* 3 (2014).
13. ju Jun, Hyun, Sang Wan Lim, and Ki Jong Kim. "Comparison of the impact of breathing strengthening exercises and balloon blowing training on the pulmonary function of elderly smokers." *Journal of International Academy of Physical Therapy Research* 6.2 (2015).
14. Jun, H. J., Kim, K. J., Nam, K. W., & Kim, C. H. (2016). Effects of breathing exercises on lung capacity and muscle activities of elderly smokers. *Journal of physical therapy science*, 28(6).
15. Hedenström, Hans, Per Malmberg, and Hrafn V. Fridriksson. "Reference values for lung function tests in men: regression equations with smoking variables." *Uppsala journal of medical sciences* 91.3 (1986).
16. Willemse, B. W., Postma, D. S., Timens, W., & ten Hacken, N. H. (2004). The impact of smoking cessation on respiratory symptoms, lung function, airway hyperresponsiveness and inflammation. *European Respiratory Journal*.
17. Garcia-Aymerich, J., Lange, P., Benet, M., Schnohr, P., & Antó, J. M. (2006). Regular physical activity reduces hospital admission and mortality in chronic obstructive pulmonary disease: a population-based cohort study.
18. Global Initiative for Chronic Obstructive Lung Disease (GOLD). (2023). Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease.
19. Mapel DW, et al. (2010). A screening tool to identify undiagnosed COPD patients. *International Journal of COPD*, 5: 21–29.
20. Todd, S., Laffan, M., Bunting, M., & Hall, A. (2018). The Breathing Pattern Assessment Tool: development and validation of a new observational tool. *Physiotherapy Theory and Practice*, 34(7), 497–506.