primary studies - published RCT

The effect of harmonica-based breathing and airway clearance exercises on pulmonary function in children with cystic fibrosis: A randomized controlled trial.

Code: PM42166879 **Year:** 2026 **Date:** **Author:** Tavasoli H

Study design (if review, criteria of inclusion for studies)

Randomized controlled trial

Participants

70 children with CF aged 8-18 years.

Interventions

Participants were randomly assigned to intervention and control groups. The intervention group performed harmonica-based breathing exercises and airway clearance techniques in addition to routine care. The control group received routine care only. The intervention was performed twice daily for 15 min over two months.

Outcome measures

Primary outcomes were forced expiratory volume in one second (FEVâ‚•) and forced vital capacity (FVC), measured at baseline and two months post-intervention. Data were analyzed using SPSS version 25.

Main results

The groups did not show a statistically significant difference in FEVâ‚• (PÂ =Â 0.38) and FVC (PÂ =Â 0.91) at the pre-test. During the intervention, six participants were excluded; therefore, the final analysis was conducted on 64 participants. The results of the ANCOVA revealed that the intervention group exhibited a significant improvement in FEVâ‚• compared to the control group post-intervention (PÂ =Â 0.002). However, no significant changes were observed in FVC (PÂ =Â 0.13).

Authors' conclusions

Harmonica-based exercises significantly improved FEVâ‚•. They may serve as a practical, low-cost adjunct to routine airway clearance in children with CF. The lack of significant FVC improvement suggests that longer intervention periods may be needed to enhance lung volumes. Practice implications Harmonica-based exercises can serve as an adjunct to routine airway clearance in children with CF.

http://dx.doi.org/10.1016/j.pedn.2026.05.012

See also

J Pediatr Nurs. 2026 May 21;89:455-461. doi: 10.1016/j.pedn.2026.05.012.

Keywords

Acapella; Active Cycle of Breathing Technique -ACBT-; Aerobic training; Airway clearance drugs -expectorants- mucolytic- mucociliary-; Airway clearance technique; Autogenic drainage; Chest physiotherapy; Chest Wall Oscillation; Child; Combined Modality Therapy; Drainage; exercise; flutter; forced expiration technique; High Frequency Chest Wall Oscillation -HFCWO-; inspiratory muscle training; Intrapulmonary Percussive Ventilation; non pharmacological intervention - devices OR physiotherapy; non pharmacological intervention - psyco-soc-edu-org; oscillating devices; Percussion; pharmacological_intervention; Positive-Pressure Respiration- PEP- pep mask; Postural Drainage; Respiratory Tract Diseases; strength training; training; VEST Airway Clearance System; Vibration;