

PURPOSE

Problem:

- Chronic Obstructive Pulmonary Disease (COPD) affects 11 million individuals in the U.S. annually and is the third leading cause of death by disease in the U.S.
- COPD results in multiple negative health outcomes, including respiratory exacerbations, increased hospital admissions, ED visits, and burdensome symptoms such as dyspnea, pain and fatigue.
- An mHealth self-management respiratory muscle strength training (RMST) program (RESP-FIT) was developed to strengthen muscles of the respiratory system and facilitate symptom monitoring and tracking to improve respiratory muscle strength, symptoms, and quality of life.

Aim: Test feasibility and acceptability of the RESP-FIT intervention. Participants will be randomized to control (symptom tracking only) or the RESP-FIT intervention.

RESP-FIT intervention (Figure 1):

- Designed to facilitate development of self-management behaviors and improve symptoms such as dyspnea and fatigue
- Expiratory muscle strength training (EMST) reduces dynamic airway inflation and increases cough propulsion strength and airway clearance. Inspiratory muscle strength training (IMST) improves exercise endurance and decreases dyspnea. Respiratory muscle strength is measured with maximum inspiratory pressure (MIP) and maximum expiratory pressure (MEP).
- Participants enroll in a 6-week, self-directed pressure threshold RMST using combined EMST/IMST and ecological momentary assessment (EMA) for symptom tracking.

Participants:

- Recruiting 30 participants over the age of 40 with COPD and a Modified Medical Research Council (MMRC) Dyspnea score >1, via MUSC clinics and MUSC Biomedical Informatics Center (BMIC).



Figure 1. Combined threshold strength trainer

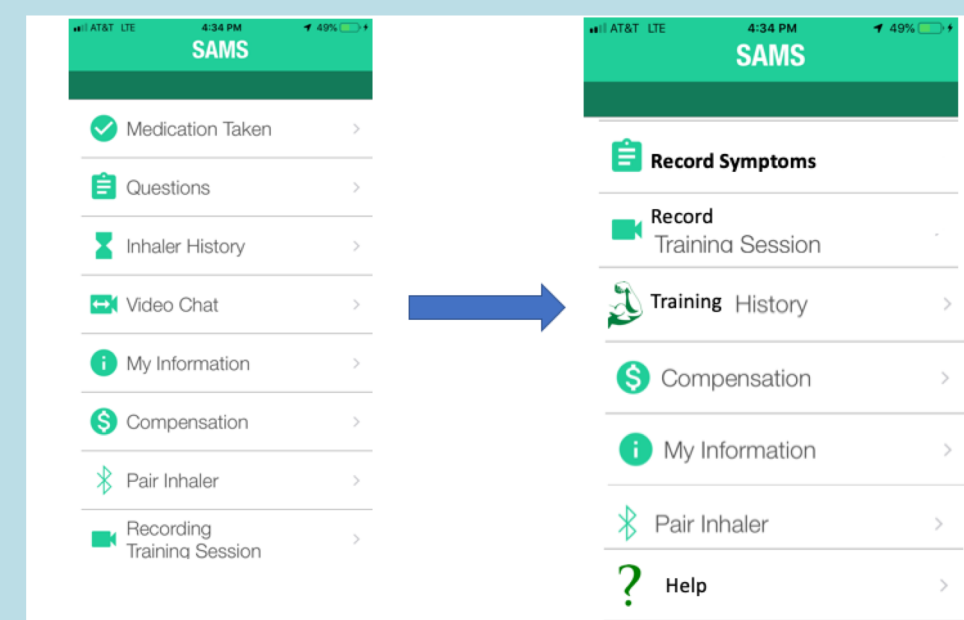


Figure 2. Current Smartphone Airway Management System (SAMS) interface change recommendations based on participant feedback. Includes EMA questions, medication log, training technique video, Bluetooth usage tracking, video chat function, and compensation log.

FINDINGS (ONGOING)

- A total of 12/30 participants have completed the intervention (intervention n=4), and n=9 are currently enrolled (intervention n=5).
- Participants in the intervention group describe feeling stronger, being able to breathe easier on their own, not needing their rescue inhaler as frequently, having less activity-related fatigue, and having a more productive cough.

| Participants (n=12 have completed, n=9 currently enrolled in 6-week intervention) | |
|---|--|
| Participant age | Mean 59 years; range 43-72 years |
| Gender | 13 female, 8 male |
| Race/ethnicity | 16 non-Hispanic White, 5 non-Hispanic Black |
| MMRC Dyspnea Score | 3 MMRC 1, 3 MMRC 2, 9 MMRC 3, 6 MMRC 4 |
| Caregiver | 14 self, 6 spouse, 1 declined to answer |
| Marital Status | 4 divorced, 12 married, 4 never married, 1 widowed |

Table 1. Sample demographics to date

| Participant suggestion/comment | Intervention revision recommendation |
|--|---|
| Verbiage on SAMS menu was confusing | Wording changed for the menu items |
| Typing information in medication challenging and tedious | Drop-down selections will be added with limited free-text sections |
| Hard to keep track of training exercises | Add virtual training log and tracker |
| App is not motivating enough | Future development will include motivational messaging and interactive education modules. |

Table 2. Example of participant feedback and intervention refinements

CONCLUSION

Recruitment and enrollment for the 6-week intervention is still ongoing. Preliminary results indicate that a 6-week combined RMST program is feasible and acceptable approach and has potential for improving self-management, increasing MIP/MEP, and reducing symptoms such as dyspnea and fatigue in a population of participants with COPD.

NEXT STEPS

- Results will inform revisions to the intervention.
- Evaluate a more holistic method (patient self-rating and tolerance) of determining RMST strength training capacity, rather than relying exclusively on MIP/MEP levels.
- Complete study enrollment.