



AOTA Evidence Briefs

Older Adults

**A product of the American Occupational Therapy Association's Evidence-Based Literature Review Project*

OA#10

A pulmonary rehabilitation program may decrease dyspnea and increase exercise endurance

Riley, P. (1996). Effects of a pulmonary rehabilitation program on dyspnea, self-care, and the physiological functioning of patients with COPD. *Rehabilitation Nursing Research*, 5, 43–52.

Level: IIB2b

Nonrandomized control trial, two groups, less than 20 participants per condition, moderate internal validity, moderate external validity

Why research this topic?

Chronic obstructive pulmonary disease (COPD) is a combination of two or more obstructive lung diseases, most commonly chronic bronchitis and emphysema. Pulmonary rehabilitation programs are designed to help patients with COPD achieve maximum functional ability. Research has not clearly documented their effectiveness, however.

What did the researcher do?

Riley (1996), of the University of Alabama (Tuscaloosa), investigated whether a pulmonary rehabilitation program for patients with COPD could reduce dyspnea ("the subjective perception of breathing difficulty" [p. 43]), increase self-care, and improve physiological functioning. Thirty-two participants began her study. All had been diagnosed with COPD, were seeing a pulmonary physician, and reported shortness of breath as a problem. Twenty-one constituted the treatment group, 11 the control group. Six participants in the treatment group failed to complete the study, however. Of the remaining 15 treatment group members, 10 were men, 5 were women. Their average age was 69.50 years. Corresponding numbers in the control group were 4 and 7, and 61.73 years.

The treatment group took part in a pulmonary rehabilitation program that entailed 36 1-hour sessions over 12 weeks. The program included extensive physiological testing at the outset. On the basis of this testing, an exercise program was planned, involving such activities as walking on an indoor track, using an armcrank, walking on a treadmill, and using a rowing machine. The participants then engaged in this exercise program during each of the 36 sessions. Following their exercise and a cool-down period, the participants attended a 15- to 30-minute program on self-care, addressing such topics as breathing methods, ways to break the cycle of panic breathing, and administration of inhaled medications.

The control group participants simply continued under the care of their pulmonary physicians, who performed some tests for the researcher.

The outcomes areas of interest were *dyspnea* (as measured by the Modified Borg Scale and the dyspnea visual analog scales); *self-care* (as measured by the COPD Self-Care Action Scale, developed by the researcher using Orem's Theory of Self-Care Deficit); *pulmonary function* (obtained from the participants' medical records); and *exercise test variables*, including oxygen uptake, carbon dioxide production, oxygen pulse, exercise minute ventilation, double product, oxygen saturation, and total treadmill time. Measures were taken before and after treatment.

What did the researchers find?

Findings on the first three outcome measures were **not significant** (see *Glossary*). “However, the treatment group’s usual levels of dyspnea did decrease after the program” (p. 48), whereas the control group’s usual levels increased. Further, “almost every patient in the treatment group reported during the home visit after the program that [his or her] level of activity had increased because of a decrease in dyspnea” (p. 50). On the measure of self-care, changes in scores were in the predicted direction.

On the fourth outcome measure, the treatment group **significantly** (see *Glossary*) increased its treadmill time.

What do the findings mean?

For therapists and other providers, the findings suggest that a pulmonary rehabilitation program can decrease dyspnea and increase exercise endurance. Participants reported increased levels of activity in self-care and home management. However, more research is needed, with larger samples, and valid instruments must be developed to measure outcomes.

What are the study’s limitations?

The study has several limitations. First, the sample may not be large enough to detect statistically significant or clinically important differences between groups. Second, the researchers do not report how participants were assigned to groups. More importantly, the control and experimental groups differed significantly on two variables (smoking and disease onset) at the outset of the study. This initial group inequality may have influenced the results. In addition, participants and evaluators were aware of the purpose of the study and group assignments. Lastly, it is unclear whether participants were receiving additional health-related services that may have influenced the results of this study.

Glossary

nonsignificant or no significance—A statistical term that refers to study findings that are likely to be due to chance differences between the groups rather than to other factors (like the treatment of interest). A nonsignificant result is not generalizable outside the study. Like significance, a nonsignificant result does not indicate the clinical effect. Often studies will show nonsignificant results, yet the treatment group’s mean will be better than the control group’s. This is usually referred to as a trend in the right direction. Because significance is closely determined by sample size, nonsignificant results would often become significant if the sample size were increased.

significance (or significant)—A statistical term, this refers to the probability that the results obtained in the study are not due to chance, but to some other factor (such as the treatment of interest). A significant result is one that is likely to be generalizable to populations outside the study.

Significance should not be confused with clinical effect. A study can be statistically significant without having a very large clinical effect on the sample. For example, a study that examines the effect of a treatment on a client’s ability to walk may report that the participants in the treatment group were able to walk significantly longer distances than the control. However, if you read the study you may find that the treatment group was able to walk, on average, 6 feet, while the control group was able to walk, on average, 5 feet. While the outcome may be statistically significant, a clinician may not feel that a 1-foot increase will make his or her client functional.

■ Terminology used in this document is based on two systems of classification current at the time the evidence-based literature reviews were completed: *Uniform Terminology for Occupational Therapy Practice—Third Edition* (AOTA, 1994) and *International Classification of Functioning, Disability and Health (ICIDH-2)* (World Health Organization [WHO], 1999). More recently, the *Uniform Terminology* document was replaced by *Occupational Therapy Practice Framework: Domain and Process* (AOTA, 2002), and modifications to *ICIDH-2* were finalized in the *International Classification of Functioning, Disability and Health* (WHO, 2001).

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