The Open Journal of Occupational Therapy

Volume 4
Issue 2 *Spring 2016*

Article 8

April 2016

An Open-Access Review to Determine Best Evidence-Based Practice for COPD

Beth Ann Walker
University of Indianapolis - USA, walkerba@uindy.edu

Heidi Breckner
heidi.stoddard@icloud.com

Morgan Carrier
carriermorgan13@gmail.com

Wendy Pullen
wmpullen09@gmail.com

Erin Reagan
erinreagan44@gmail.com

See next page for additional authors

Recommended Citation

Walker, B., Breckner, H., Carrier, M., Pullen, W., Reagan, E., Telfer, L., & Zimmerman, T. (2016). An Open-Access Review to Determine Best Evidence-Based Practice for COPD. *The Open Journal of Occupational Therapy, 4*(2). https://doi.org/10.15453/2168-6408.1199

An Open-Access Review to Determine Best Evidence-Based Practice for COPD

Abstract

Background: The manifestation of Chronic Obstructive Pulmonary Disease (COPD) can have an enormous impact on individuals' areas of occupation, specifically activities of daily living. Occupational therapy (OT) practitioners have the ability to efficiently treat these clients using evidence-based interventions to achieve optimal functioning and quality of life. The purpose of this research study was to identify specific interventions supported by evidence for consumers with COPD using an open-access database for OT.

Method: A thematic synthesis of 102 articles available on COPD via the open-access database OTseeker was used in this study. A constant comparison approach revealed seven descriptive themes for intervention including exercise, education, self-management, cognitive-behavioral therapy, complementary and alternative medicine therapy, breathing technique training, and nutrition.

Results: For each theme, sub-themes were discussed and components of effective interventions were identified. Aspects of an evidence-based intervention program for individuals with COPD were outlined.

Conclusion: Occupational therapists can use this evidence to thoroughly design well-rounded effective evidence-based intervention programs to enable individuals with COPD to live life to its fullest.

Keywords

COPD, evidence-based practice, open-access, thematic synthesis

Cover Page Footnote

The researchers would like to thank Dr. Jennifer Radloff, OTD, OTR/L, CDRS for her assistance with the initial framework for this critical inquiry into COPD.

Complete Author List

Beth Ann Walker, Heidi Breckner, Morgan Carrier, Wendy Pullen, Erin Reagan, Lisa Telfer, and Taryn Zimmerman

Credentials Display

Beth Ann Walker, PhD, OTR; Heidi Breckner, MOT, OTR; Morgan Carrier, MOT, OTR; Wendy Pullen, MOT, OTR; Erin Reagan, MOT, OTR; Lisa Telfer, MOT, OTR; Taryn Zimmerman, MOT, OTR

DOI: 10.15453/2168-6408.1199

Chronic Obstructive Pulmonary Disease (COPD) is the third leading cause of death in the United States (U.S. Department of Health and Human Services [HHS], 2012). COPD is a progressive and irreversible disease that affects the respiratory process of gas exchange occurring in the lungs, which blocks airflow and makes it challenging to breathe (Mayo Clinic, 2011). COPD is an incurable disease but can be managed through lifestyle adaptations and modifications (HHS, 2012). COPD symptoms impact many areas of occupation, specifically activities of daily living (ADLs). Occupational therapy (OT) practitioners have the ability to treat these clients efficiently by using evidence-based interventions to achieve optimal functioning and improve quality of life.

With the growing emphasis for occupational therapists to use evidence-based practice to guide the care they provide, it is imperative that OT practitioners are knowledgeable and competent when providing treatment for clients with COPD. According to the American Occupational Therapy Association's (AOTA) Centennial Vision, "occupational therapy is a powerful, widely recognized, science-driven, and evidence-based profession with a globally connected and diverse workforce meeting society's occupational needs" (AOTA, 2007, p. 614). Further, the use of evidence-based practice has also been attributed to increased client care, enhanced outcomes, and decreased health care costs (Melnyk, Fineout-Overholt, Stillwell, & Williamson, 2010). Therefore, existing evidence on interventions for COPD needs to be examined to determine the components of a well-rounded, evidence-based OT intervention protocol for COPD. Another core feature of evidence-based practice is the rating of the quality of clinical evidence. The emphasis on intervention effectiveness has placed importance on level 1 research, which consists of randomized controlled trials and systematic reviews (Law & MacDermid, 2008).

Before an OT practitioner can examine and apply evidence-based practice, the practitioner must be able to access and retrieve the evidence (Fell & Burnham, 2004). The literature indicates many barriers to the use of evidence-based practice, including practitioner time constraints, availability of research, quality of research, amount of practitioner effort or motivation required, difficulty searching databases, difficulty evaluating research, inadequate research skills and knowledge, and comfort with reliability of research findings (Bennett et al., 2003; Döpp, Steultjens, & Radel, 2012; Dubouloz, Egan, Vallerand, & von Zweck, 1999; McCluskey & Cusick, 2002; Pollock, Legg, Langhorne, & Sellars, 2000; Upton Stephens, Williams, & Scurlock-Evans, 2014; Welch & Dawson, 2006).

Additionally, with the plethora of databases and journals available for research in health care, many OT practitioners find it difficult to navigate through and locate relevant research because of account and/or membership requirements for various databases and journals. Many OT practitioners consider the pursuit of evidence to drive practice as a daunting process. However, in order to embrace the vision of OT as an evidence-based profession, occupational therapists need to be

able to access and retrieve the evidence quickly in order to provide best practice.

OTseeker is a free, online open-access database that contains abstracts of systematic reviews and randomized controlled trials relevant to OT interventions found by searching Medline, CINAHL, ERIC, EMBASE: Rehabilitation and Physical Medicine, AMED, Psych INFO, the Cochrane Library, CancerLit, and Ageline (McKenna et al., 2004). Randomized controlled trials contained in OTseeker have been appraised by two trained raters using the PEDro scale, which has a maximum possible score of 10, reflecting interpretability of results, methodological quality, and susceptibility to bias (McCluskey et al., 2006). According to McKenna et al. (2004), the decision for including studies is rather inclusive in order to capture the broad scope of the profession with international access. In sum, the aim of the database is to help OT practitioners efficiently identify high-quality, pre-appraised research (McCluskey et al., 2006). Thus, the purpose of this critical appraisal was to identify specific interventions supported by evidence for consumers with COPD using an open-access database for occupational therapists to determine the components of a well-rounded evidence-based OT intervention protocol for COPD.

Methodology

Given the broad scope of OT practice, which includes providing high-quality individualized care for each person with COPD, the investigators sought a methodology that would provide contextual detail of a broad scope of interventions found in systematic reviews and randomized controlled trials while also lending itself to greater ease of interpretation by practitioners. A thematic synthesis is a qualitative approach, which aims to draw conclusions based on common themes across heterogeneous studies (Lucas, Baird, Arai, Law, & Roberts, 2007). The process of a thematic synthesis includes extracting data, line-by-line coding of themes, forming descriptive codes, examining similarities and differences among descriptive codes in order to group them into descriptive themes, and producing analytical themes in light of the research question (Thomas & Harden, 2008).

The OTseeker database contains abstracts of systematic reviews and randomized controlled trials relevant to OT interventions. Thus, investigators conducted a thematic synthesis of the literature available on COPD via the open-access database OTseeker. COPD and its related interventions were the focus of this search; therefore, the only search term used was COPD. This search term yielded 119 articles on October 22, 2013. Twenty-three of these articles were classified as systematic reviews and 79 were classified as randomized controlled trials. Seventeen articles were removed because they were not relevant to the purpose of the study. Criteria for removal included: focus of article included diagnoses or medical conditions other than COPD (five); focus on research was beyond the scope of practice of occupational therapy (e.g., comparing financial outcomes of various health care management systems) (six); focus of article was on smoking cessation rather than COPD (three); and inability to acquire article or translate into English (three). After exclusions, 102 articles were included in this analysis. A quality assessment of

the literature was assumed given the aforementioned stringent inclusionary guidelines of OTseeker.

Investigators used a constant comparative approach to analyze the text of each article whereby concepts are developed from the data by coding and analyzing simultaneously (Taylor & Bogdan, 1998). First, the principal investigator provided training to the research team on thematic synthesis and constant comparison techniques. Articles were divided among the research team and each article was read in its entirety. Next, the seven-member research team reviewed and open-coded each article for relevancy to the purpose of the study, intervention type, and outcome. This process created a total of seven initial codes. Researchers looked for similarities and differences between codes in order to start grouping them into broad themes until data saturation and informational redundancy was reached. Components were coded and cross-coded to omit any bias, and codes and categories were continuously discussed among the research team until a consensus was reached to ensure reflexivity. Seven different descriptive themes emerged from this process, including exercise, education, self-management, breathing technique training, cognitive behavioral therapy, complementary and alternative medicine therapy, and nutrition. The articles were then redistributed among the team members to be reviewed and crosschecked to ensure validity of the themes and to provide investigator triangulation. Each descriptive theme was then sub-coded for effectiveness if presented in the literature (see Table 1). Memos were written, sorted, and used throughout the analysis. Investigators received feedback from peer review by colleagues in OT.

Table 1
Noteworthy Codes and Themes

Category, Subcategory, and Code	Number of articles
Exercise	59
Upper and lower extremity training	10
Maintenance programs	6
Session duration	4
Program duration	20
Alternative exercise programs	4
Supervision	4
Education	15
Proper exercise techniques	1
Medication management	4
Educational setting	3
Disease management	7
Self-Management	16
Disease mastery	8
Action plans	5
Telemonitoring	3
Cognitive-Behavioral Therapy	8
Complementary and Alternative Medicine Therapy	9
Muscle relaxation	5
Guided imagery	2
Music therapy	2
Acupressure	1
Breathing Technique Training	7
Nutrition	2

Findings

Exercise

Exercise was a major component of an effective intervention program. Fifty-nine articles were located in which researchers implemented exercise as an intervention. Components of exercise examined by the researchers included upper and lower extremity training, maintenance programs, session duration, program duration, alternative exercise programs, exercise setting, and the effects of coaching on exercise.

Upper and lower extremity training. Eight articles indicated that exercise interventions focusing on extremity training provided beneficial results. Lacasse, Guyatt, and Goldstein (1997) reviewed the literature and concluded that systemic (upper body and lower body) exercise training increased exercise capacity. Salman, Mosier, Beasley, and Calkins (2003) found that lower extremity training increased neuromuscular coordination; therefore, symptoms of dyspnea perceptions improved. Nava (1998) found similar positive results for incorporating a lower extremity workout to decrease symptoms of dyspnea when implemented acutely following a hospital admission. Janaudis-Ferreira, Hill, Goldstein, Wadell, and Brooks (2009) also determined that an arm-training program was successful in increasing exercise capacity. In regard to upper extremity training, researchers found that participants' ratings of perceived breathlessness and fatigue also decreased after training (Ries, Ellis, & Hawkins, 1988). The addition of strength training into an effective intervention program may improve the ability to perform ADLs (Alexander, Phillips, & Wagner, 2008). Nakamura et al. (2008) determined that strength training combined with aerobic exercise is most effective for those with COPD. These researchers suggested that if the aerobic exercise was recreational in nature, then the outcomes were increasingly effective (Nakamura et al., 2008).

Maintenance programs. Soysa, McKeough, Spencer, and Alison (2012) examined the effects of maintenance on exercise capacity and concluded that it was likely that 12-month maintenance programs were effective in sustaining improvements in exercise capacity. Brooks, Krip, Mangovski-Alzamora, and Goldstein (2002) determined that 6-month postrehabilitation programs maintained exercise tolerance. Authors of a systematic review of the literature found seven studies with evidence to support a postrehabilitation exercise program (Beauchamp, Evans, Janaudis-Ferreira, Goldstein, & Brooks, 2013). Investigators determined that through the postrehabilitation exercise program, consisting of walking and cycling, benefits for exercise capacity were maintained at the 6-month checkup (Beauchamp et al., 2013).

Session duration. Three articles examined the effects of exercise session duration on COPD. Fernández et al. (2009) concluded that an effective intervention program consisting of 30 min of exercise every other day improved quality of life (QoL). The participants of another study completed 20 min exercise sessions, three times a week, and concluded that QoL scores improved (Paz-Diaz, de Oca, López, & Celli, 2007). Güell

et al. (2006) found that participants who exercised five times a week for 30 min showed significant improvements in QoL related to disease mastery.

Program duration. Fifteen articles examined the effects of exercise program duration and the positive effects on clients with COPD. Researchers compared how exercise affects individuals participating in a pulmonary rehabilitation program of differing durations (Green, Singh, Williams, & Morgan, 2001). Lacasse et al. (1996) performed a meta-analysis and concluded that dyspnea was decreased for individuals with COPD if the program included at least 4 weeks of exercise training. Cambach, Wagenaar, Koelman, van Keimpema, and Kemper corroborated the results (1999). Criner et al. (1999) found that clients with COPD responded with increased QoL after participating in an 8-week exercise program. Cambach, Chadwick-Straver, Wagenaar, van Keimpema, and Kemper (1997) found similar results using a 3-month study design. A 6-month outpatient program found that clients trained in moderate to high intensity exercise training experienced improvements to their QoL (Finnerty, Keeping, Bullough, & Jones, 2001) and changes in respiratory and peripheral muscle strength, 6 min walk distance, and maximal exercise performance lasting 18 months after starting the program (Troosters, Gosselink, & Decramer, 2000).

In a similar exercise program, which implemented a 10-day (hospital) and 6-month (home-based) walking program for individuals at the hospital when admitted for COPD exacerbations and carried that program into the home setting once discharged, resulted in significant improvements in COPD symptoms, along with an increase in QoL (Behnke et al., 2000). A study by Emery, Schein, Hauck, and MacIntyre (1998) controlled for exercise with an experimental group who performed aerobic exercise for 5 weeks. The researchers found that the experimental group had decreased symptoms of depression and anxiety, demonstrating that exercise-related programs produce observable changes (Emery et al., 1998), whereas Güell et al. (2000) found results supporting a program that included 3 months of daily exercise. During a 6-week pulmonary rehabilitation program, participants received exercise training from a physiotherapist two times a week for 1 hr and were encouraged to exercise one to two times daily, 5 days per week (Finnerty et al., 2001). Once the study concluded, results indicated clinically significant improvements in QoL as tested by the Saint George Respiratory Questionnaire (SGRQ), at both 3- and 6-month follow-ups (Finnerty et al., 2001). Clients who received 7-weeks of aerobic walking and strength training therapy recorded clinically significant improvements to their QoL compared to those attending the 4-week program (Green et al., 2001). Gayle, Spitler, Karper, Jaeger, and Rice (1988), found that when exercise was performed for 14-weeks, symptoms of anxiety decreased. Gormley, Carrieri-Kohlman, Douglas, and Stulbarg (1993) found that individuals who exercised on a treadmill three times a week for 4 weeks showed an increase in self-efficacy and

walking performance. Last, Romagnoli et al. (2006) concluded that an inpatient pulmonary rehabilitation program implemented at 6 and 12 months after an initial inpatient hospital stay led to improved physiological and clinical benefits over 1 year. Beauchamp, Janaudis-Ferreria, Goldstein, and Brooks (2011) conducted a literature review and concluded that longer duration pulmonary rehabilitation programs, lasting up to 3 years, appeared to have more favorable effects on clients' QoL.

Alternative exercise programs. Four articles examined interventions related to alternative exercise programs: Tai Chi, yoga, and Qigong. The researchers found that Tai Chi contributed to improvements in health outcomes in terms of a client's perception of respiratory symptoms and increased participation in daily physical activities (Chan, Lee, Suen, & Tam, 2010). The researchers also determined that a Tai Chi exercise program was safe and enjoyable for the participants (Chan et al., 2010). Donesky-Cuenco, Nguyen, Paul, and Carrieri-Kohlman (2009) researched yoga as an exercise intervention program and determined that yoga was beneficial for decreasing dyspnea-related distress. As an additional home exercise program, Qigong has been a traditional "mind-body" exercise. Qigong showed positive effects when used as a carry-over after an inpatient rehabilitation program until 6 months postdischarge (Ng, Tsang, Jones, So, & Mok, 2011). Furthermore, Chan, Lee, Suen, and Tam (2011) found that implementing a Tai Chi Qigong program improved respiratory functioning and activity tolerance.

Supervision. Investigators found two articles in which supervision was given to individuals during an 8-week treadmill exercise program, both of which yielded physiological improvements for people with severe COPD (Puente-Maestu, Sanz, Sanz, Cubillo et al., 2000; Puente-Maestu, Sanz, Sanz, Ruiz et al., 2000). Increasing the intensity of the training of the supervised group resulted in greater physiological effects in the individuals (Puente-Maestu, Sanz, Sanz, Ruiz et al., 2000). Researchers felt this was due to individuals pushing themselves harder, and thus increasing their intensity, when being supervised.

Exercise interventions not found to be significant. Several studies did not demonstrate significance for interventions with clients having COPD. Ringbaek and colleagues (2000) evaluated the results of an exercise intervention program and found it to be ineffective for consumers with COPD. Ringbaek et al. concluded that a rehabilitation program consisting of exercise sessions twice a week for 8 weeks did not improve exercise capacity and QoL among its participants. Researchers attributed this lack of improvement to insufficient duration, frequency, and intensity of the program (Ringbaek et al., 2000). White, Rudkin, Harrison, Day, and Harvey (2002) recruited participants with severe COPD to determine if a pulmonary rehabilitation program would increase their QoL. After meeting twice a week for 6 weeks, the participants did not reach statistically significant improvements in their QoL (White et al., 2002). Results obtained by Gayle et al. (1988) found that when exercise was performed for 14

weeks, it did not decrease symptoms of depression; however, they noted that a small sample size might have contributed to statistically insignificant results. Karapolat et al. (2007) evaluated the effects of a short-term rehabilitation program using an exercise component and the general findings indicated results for decreased dyspnea were not maintained at the 1-month mark (Karapolat et al., 2007). Last, Elliott, Watson, Wilkinson, Musk, and Lake (2004) completed a study and found that a 3-month community exercise program is ineffective in increasing exercise tolerance based on a participant's 6-min walking distance results. Of the articles examined, strength training was not a major component of an exercise intervention. However, two studies found that incorporating strength training with aerobic training did not influence improvement in exercise capacity or QoL (Bernard et al., 1999; Mador, Bozkanat, Aggarwal, Shaffer, & Kufel, 2004).

Regarding postrehabilitation programs, several articles were found that did not demonstrate evidence for effectiveness. Brooks et al. (2002) based their research on post-rehabilitation programs to determine if they are necessary to maintain the results of a short-term program. However, researchers concluded that functional exercise capacity and health-related QoL deteriorated over 12 months following the completion of the postrehabilitation program (Beauchamp et al., 2013; Brooks et al., 2002). This decline was attributed to poor compliance while completing the postrehabilitation program (Brooks et al., 2002). According to Román et al. (2013), clients with moderate COPD and low levels of impairment did not show meaningful changes in QoL, exercise tolerance, or pulmonary function following a 9-month maintenance program. Linneberg et al. (2012) found that clients who engaged in a pulmonary rehabilitation program implementing six supplemental exercise sessions unsuccessfully improved their endurance shuttle walking time or QoL at the 1-year follow up (Linneberg et al., 2012).

Two articles were found that studied the effects of exercise with coaching and found this type of intervention to be unsuccessful. Carrieri-Kohlman, Gromley, Douglas, Paul, and Stulbarg (1996) studied the effects of an exercise program group versus a coached exercise group and concluded that exercise was a critical component of rehabilitation, but that coaching did not decrease dyspnea symptoms. Carrieri-Kohlman et al. (2001) found the same results in a later study. Researchers found that coached exercise did not provide any extra benefits in decreasing dyspnea-related anxiety. Last, Tang, Blackstock, Clarence, and Taylor (2012) concluded that twice daily 15-min exercise sessions were not feasible when comparing the intervention group versus the control group; however, a larger sample size was needed to make an accurate determination about whether an exercise program was safe and feasible.

Education

Education has been found to be an integral part of an effective intervention program in the treatment for people with COPD (Paz-Diaz et al., 2007). Fifteen articles were found that addressed the positive effects of an education component in an intervention program. Interventions implemented

by the researchers included education of medication management and disease management.

Medication management. Educating participants on medication management can play a major role in interventions for people with COPD. Four articles were found that addressed this topic. Elliott et al. (2004) used education on medication management with regard to proper intake. Clients were advised to use bronchodilators before community and hospital education sessions, which proved to be an important aspect of a rehabilitation program (Elliott et al., 2004). Through the understanding of symptoms and medications needed to prevent acute exacerbations, individuals developed the skills to master the disease and symptoms (Sedeno, Nault, Hamd, & Bourbeau, 2009). Monninkhoff, van der Valk, van der Palen, van Herwaarden, and Zielhuis (2003) also reviewed medication from a different aspect and found that proper education on COPD decreased the need to use emergency medication. Gallefoss and Bakke (2000) educated clients on recognizing early signs of exacerbations, effects, and the proper use of medication and found that participants decreased primary care physician visits.

Disease management. Educating clients with COPD on the signs and symptoms of the disease as well as the anatomy of the respiratory system can significantly improve overall QoL and give a sense of control over the disease. Lemmens, Nieboer, and Huijsman (2009) reviewed intervention strategies, such as patient education on disease management, professional practice behavior, and organization of care. Researchers discovered through the implementation of a disease management program that there was an increase in QoL (Lemmens et al., 2009). Davis, Carrieri-Kohlman, Janson, Gold, and Stulbarg (2006) described self-efficacy as a person's belief in his or her ability to manage symptoms and to organize and execute appropriate actions necessary to accomplish meaningful goals. Researchers concluded that education significantly improved clients' ability to manage shortness of breath (Davis et al., 2006). Román et al. (2013) assessed the implementation of an education session on the anatomy and function of the respiratory system. The authors discovered that after a 1-year program, individuals improved their level of control in relation to the disease (Román et al., 2013). Zhou et al. (2010) also found that health education improved QoL and decreased exacerbations and mortality due to COPD. Clients who were educated on the many aspects of the disease developed self-efficacy, which played an important role in treatment (Lacasse et al., 1997).

Education-based intervention findings not found to be significant. Gallefoss, Bakke, and Rsgaard (1999) implemented a 19-page educational booklet consisting of information regarding medication management, compliance, self-care, and self-management for people with asthma and COPD; however, researchers determined that positive effects were limited to an increase in QoL for people with asthma but not for those with COPD. Last, de Bruin, Heijink, Lemmens, Struijs, and Baan (2011) explained that although it was widely understood and believed that disease management programs reduce overall health care

expenditures, evidence pertaining to this belief gained from their present study is still inconclusive (de Bruin et al., 2011).

Self-Management

Self-management has been found to be an integral part of pulmonary rehabilitation in the treatment of COPD clients (Paz-Diaz et al., 2007). Sixteen articles were found that implemented self-management as an intervention. Self-management interventions implemented by the researchers included disease mastery, action plans, and telemonitoring. Research has shown that self-management can have positive results on a client's COPD symptoms, allowing clients to increase their knowledge and giving them the ability to manage their symptoms on a daily basis (Carrieri-Kolhman et al., 2005). Research on the use of self-management as an intervention demonstrated a reduction in the need for rescue medications, general practitioner and hospital visits, improved confidence in handling exacerbations, and decreased overall health care costs (Effing et al., 2003; Gallefoss, 2004; Gallefoss & Bakke, 2002). Another study examined the effects of a disease self-management program and found the experimental group to be more capable of managing exacerbations than the control group (Bischoff et al., 2012).

Disease mastery. A systematic review conducted by Bourbeau (2003) indicated that a disease-specific self-management program was found to increase a client's overall health status. Blackstock and Webster (2007) conducted a systematic review that defined self-management as focusing on changing health behaviors, setting goals, and developing a plan. Researchers discovered that programs of disease-specific self-management improved QoL in individuals with COPD (Blackstock & Webster, 2007). The components of self-management and disease management programs share similar concepts; therefore, both are effective in increasing QoL.

Action plans. Three articles were found implementing an action plan to assist in the effectiveness of a self-management program. A study conducted by Sedeno et al. (2009) paired a self-management program with a written action plan to determine its effectiveness on participants' recognition and response in the case of acute exacerbation onset. As a result, positive changes were discovered in the participants' behaviors toward recognition and reaction time, thus reducing the number of hospital visits (Sedeno et al., 2009). A similar study conducted by Rea et al. (2004) exhibited the reduction of hospital visits and improved pulmonary functioning through the implementation of a disease management program, including a patient-specific care plan, action plan, and primary care visits. In this particular study, the participants were given a care plan that included how to manage COPD symptoms, when to call the general physician, and options for self-medicating (Rea et al., 2004). This plan also included regular checkups with a general physician and goals for lifestyle changes (Rea et al., 2004). It was concluded that when the participants were proactive in managing symptoms, the length of time they were in the hospital due to exacerbations was reduced (Rea et al., 2004). Carrieri-Kohlman et al. (2005) conducted a self-management program,

which included individualized instruction, a home walking prescription, and nurse telephone calls to monitor patient progress. Researchers found that a self-management program resulted in significant improvements of dyspnea, which successfully increased performance of ADLs over a 12-month period (Carrieri-Kohlman et al., 2005).

Telemonitoring. Studies have examined the potential for telehealth interventions to create positive outcomes for patients and to reduce contact with primary care physicians as well as to decrease hospital admissions. Telemonitoring has allowed clients to be monitored in the home by specialists and to assist in reducing physician visits (Lewis et al., 2011). Lewis et al. (2011) performed a 6-month trial using telemonitoring as an intervention for participants to record their symptoms and physical observations twice a day. The individuals who participated in telehealth reported greater increases in general health and social functioning and improvements in depression symptom scores (Gellis et al., 2012).

Self-management programming not found to be significant. Bucknall et al. (2012) conducted research concerning self-management and case management programs related to disease mastery and its effectiveness. The research focused on improving early symptom detection and coping skills in the threat of an acute exacerbation (Bucknall et al., 2012). The authors concluded that the intervention program did not lead to a decrease in hospital admissions or deaths following an acute exacerbation (Bucknall et al., 2012). Action plans are another type of intervention used to assist individuals with COPD in managing symptoms. Watson et al. (1997) conducted a study in which participants were given an action plan and booklet to aid in the introduction of self-management skills. The participants positively received the action plan and booklet, but the results failed to demonstrate changes in the participants' self-management skills regarding their overall QoL (Watson et al., 1997). Monninkhof, van der Valk, van der Palen, van Herwaarden, Partridge et al. (2003) found that providing participants with action plans did not improve their QoL or decrease their hospital stays and visits to the emergency room. Telemonitoring is an intervention that brings about new and emerging discussion regarding its effectiveness, and mixed information has been found regarding this type of new treatment in individuals with COPD. The use of telemonitoring was found to be an ineffective treatment for the participants with stable COPD (Lewis et al., 2011).

Cognitive-Behavioral Therapy

Psychosocial and/or cognitive behavioral interventions have been found to be an integral part of pulmonary rehabilitation in the treatment of people with COPD in order to decrease and manage symptoms (Paz-Diaz et al., 2007). Eight articles were found that implemented psychosocial and/or cognitive behavioral techniques as an intervention. In their systematic review, Baraniak and Sheffield (2011) found that interventions focused on cognitive-behavioral therapy (CBT) helped to decrease anxiety. Clients who received 12 psychotherapy sessions had statistically significant improvements to their levels of anxiety and depression (de Godoy & de Godoy, 2003). Hynninen, Bjerke, Pallesen, Bakke, and Nordhus

(2010) examined the impact of CBT on reducing anxiety and depression in participants with COPD using CBT sessions. Sessions were designed to modify how participants managed COPD. It was concluded that CBT had a clinically significant impact on levels of anxiety (Hynninen et al., 2010). Another group of researchers also found that participants of a CBT group showed significantly lower anxiety scores (Livermore, Sharpe, & McKenzie, 2010). Kunik et al. (2008) and Coventry and Gellatly (2008) found similar results regarding significant improvements in anxiety and depression after participants attended CBT sessions. Jonkers, Lamers, Bosma, Metsemakers, and van Eijk (2012) examined the effects of a minimal psychological intervention (MPI) based on the principles of CBT. Results indicated that clients who participated in the MPI reported greater confidence in their ability to manage and execute health-related behaviors and decrease depression (Jonkers et al., 2012). Kunik et al. (2001) found the same results as the above researchers but found that as little as one 2-hr CBT therapy session, consisting of relaxation training, cognitive interventions, and graduated practice, followed by homework and weekly calls for 6 weeks, can produce the same benefits in reducing anxiety and depression symptoms.

Complementary and Alternative Medicine Therapy

Nine articles reported evidence in support of muscle relaxation, guided imagery, music therapy, and acupressure. Devine and Pearcy (1996) completed a meta-analysis of the literature and determined that muscle relaxation as an intervention demonstrated statistically significant results on decreasing dyspnea symptoms. Researchers also concluded that guided imagery alone had positive effects on decreasing dyspnea symptoms (Devine & Pearcy, 1996). Baraniak and Sheffield (2011) examined interventions focused on progressive muscle relaxation training and the results indicated a decrease in anxiety. One group of researchers investigated the use of progressive muscle relaxation techniques in conjunction with music therapy and found that when performed together, they resulted in decreased symptoms of dyspnea (Singh, Rao, Prem, Sahoo, & Keshav, 2009). Bauldoff, Hoffman, Zullo, and Sciurba (2002) researched the effectiveness of using distractive auditory stimuli (DAS) in the form of music to encourage adherence to a walking program. It concluded that participants displayed improvements in functional performance and decreased dyspnea (Bauldoff et al., 2002). Wu, Lin, Wu, and Lin (2007) investigated whether acupressure as a relaxation technique would lessen dyspnea and reduce depression in clients with COPD. The findings concluded that implementing an acupressure program in clinical practice, communities, and long-term care units may lessen chronic dyspnea and depression in persons with COPD (Wu et al., 2007). Last, taped relaxation messages were an effective intervention in decreasing dyspnea and anxiety (Gift, Moore, & Soeken, 1992).

Complementary and alternative medicine therapies not found to be significant. Not all research yielded evidence of success regarding psychosocial interventions. Sassi-Dambron, Eakin,

Ries, and Kaplan (1995) designed a clinical trial to examine the instruction and practice of progressive muscle relaxation techniques, breathing retraining, pacing, self-talk, and panic control. The researchers concluded that strategies could not be implemented alone without the other critical components of a comprehensive pulmonary rehabilitation program (Sassi-Dambron et al., 1995). Incalzi et al. (2008) researched the effects of a cognitive training program aimed at increasing attention, learning, and logical-deductive thinking for those suffering from cognitive impairments as a result of the disease. It was determined that these cognitive interventions had no significant effect on the participants (Incalzi et al., 2008). Louie (2004) researched the effects of guided imagery relaxation in people with COPD to assess whether decreased anxiety induced physiological symptoms. The investigators found that the intervention did not reduce physiological symptoms, specifically dyspnea, which can be heightened as a result of COPD (Louie, 2004).

Breathing Technique Training

Respiration techniques are becoming more widely used as an effective treatment of COPD (Lacasse et al., 1997). Common terms used for respiration techniques implemented by the researchers included breathing retraining, breathing exercises, body positioning, breathing techniques, and controlled breathing. Seven articles were found that implemented respiration techniques as an intervention.

Shortness of breath, also known as dyspnea, is the most common symptom and complaint for people living with COPD (Carrieri-Kohlman et al., 2005). Breathing technique training improved dyspnea and QoL and increased clients' exercise tolerance (Güell et al., 2000). A 16-week pulmonary rehabilitation program was implemented that included breathing technique training (Güell et al., 2000). Participants exhibited an improvement in six MWT scores, validating the program's effectiveness (Güell et al., 2006). Lacasse et al. (1997) also found that including breathing exercises in a pulmonary rehabilitation improved functional exercise capacity. Breathing retraining has been found to show benefits in increasing QoL in people with COPD when incorporated into an outpatient rehabilitation program (Güell et al., 2000). Other effective respiration techniques, including modified body positions and breathing techniques (pursed-lip breathing, expiratory abdominal augmentation, and synchronization of thoracic and abdominal movement), increased the QoL by decreasing dyspnea (Karapolat et al., 2007).

Respiratory techniques not found to be significant. Research was conducted to assess the effectiveness of a 3-month pulmonary rehabilitation program that included self-conscious breathing control, diaphragmatic breathing control, and exercises for the chest and abdominal muscle walls (Román et al., 2013). There was no significant improvement in the participants' functional exercise capacity (Román et al., 2013). A study comparing the effectiveness of a 4-week pulmonary rehabilitation program was performed, consisting of controlled breathing interventions (van Gestel et al., 2012). The interventions did not have an effect on exercise capacity (van Gestel et al., 2012). Mindfulness-based breathing and complementary and alternative medicine therapy

used as an intervention were not effective methods to increase QoL (Mularski et al., 2009). Controlled breathing techniques when included in a rehabilitation program had no effect on QoL (van Gestel et al., 2012).

Nutrition

Two articles were identified that used nutrition as a part of an effective intervention program. Due to the lack of specificity provided in the examined articles, there were no common themes identified. Although there were no themes identified, researchers noted the need for further research on the nutritional component of an effective intervention program. A systematic review was examined, and the investigators identified 24 studies on how pulmonary rehabilitation improves the QoL among people with COPD, as well as which interventions produce the most significant effects (Moullec, Laurin, Lavoie, & Ninot, 2011). With regard to nutrition, aspiration of food and liquid was linked to an increase in recurrent COPD exacerbations and complications (Moullec et al., 2011). It was concluded that in providing dysphagia management and education to clients participating in a pulmonary rehabilitation program, individuals were able to better identify and self-manage dysphagia, which enhanced QoL (Moullec et al., 2011). Participants were provided information on healthy eating through a variety of educational avenues, such as group lectures, individual consultations, videos, and reading material (Zhou et al., 2010). At the conclusion of the study, however, this information did not lead to improvements of COPD symptoms (Zhou et al., 2010).

Discussion

The purpose of this research study was to identify specific interventions supported by evidence for clients with COPD using an open-access database for OT. Researchers found that a multicomponent intervention program was most effective in treating the symptoms of COPD.

An effective exercise program consists of several different components. Strength training of both upper and lower extremities is incorporated to decrease dyspnea, increase exercise capacity, and increase an individual's ability to perform ADLs (Alexander et al., 2008; Hernández et al., 2000; Janaudis-Ferreira et al., 2009; Lacasse et al., 1997; Ries et al., 1988; Salman et al., 2003). A post exercise maintenance program following a pulmonary rehabilitation program should be developed and implemented due to its ability to increase exercise tolerance and its ability to maintain positive results in exercise capacity (Beauchamp et al., 2013; Brooks et al., 2002; Soysa et al., 2012).

Exercise session and program duration are important considerations in an effective intervention program. An exercise session that occurred for 20-30 min between either three to five times a week was shown to be effective in increasing improvements in QoL (Fernández et al., 2009; Güell et al., 2006; Paz-Diaz et al., 2007). Positive results for program duration were found for programs lasting from 1-6 months. The benefits showed improvements to QoL, decreased dyspnea, decreased symptoms of depression and anxiety, and increased self-efficacy (Cambach et al., 1997;

Emery et al., 1998; Finnerty et al., 2001; Green et al., 2001; Güell et al., 2000; Lacasse et al., 1996).

Specific types of exercise should also be incorporated into the exercise portion of an effective intervention program. Tai Chi and yoga contributed to improvements in health outcomes in terms of perception of breathing symptoms and increased participation of daily physical activities (Chan et al., 2010; Donesky-Cuenco et al., 2009). The last aspect of exercise that should be taken into account is the setting in which it is occurring. Effective intervention programs for exercise in an outpatient program, home setting, and community setting proved to be beneficial in improving QoL, self-efficacy, and managing dyspnea (Cambach et al., 1997; Davis et al., 2006; Man et al., 2004; Vieira, Maltais, & Bourbeau, 2010; Wijkstra et al., 1994).

A successful education program should include education on the disease, exercise, and medication, and should take into account the setting in which the education takes place. When education regarding proper exercise techniques was implemented, greater gains were found in overall health status (Norweg, Whiteson, Malgady, Mola, & Rey, 2005). Clients educated about proper medication management and the use of bronchodilators were able to better prevent acute exacerbations and adopt the skills needed to master the disease as well as decrease visits to primary care physicians (Elliott et al., 2004; Gallefoss & Bakke, 2000; Monninkhoff, van der Valk, van der Palen, van Herwaarden, and Zielhuis, 2003; Sedeno et al., 2009). Educating clients on the specific signs, symptoms, and anatomy can increase their overall QoL by managing dyspnea and improving levels of disease control (Davis et al., 2006; Lacasse et al., 1997; Lemmens et al., 2009; Román et al., 2013; Zhou et al., 2010). Through an education program in a home or outpatient setting, results can be produced to prevent exacerbations (Maltais et al., 2008; Strijbos, Postma, van Altena, Gimeno, & Koëter, 1996a).

A successful self-management program would include the ability and confidence to self-manage the disease process. When clients increase their ability to self-manage their disease, they are enabled to reduce the need for rescue medications, decrease hospital visits, and improve confidence and overall QoL mastery. A common self-management technique has been identified as a written action plan that allows for positive changes in behaviors that relate to recognition and reaction time of exacerbations (Rea et al., 2004; Sedeno et al., 2009). Telehealth, as a form of self-management, increased participants' general health, social functioning, and depression (Gellis et al., 2012; Lewis et al., 2010).

A successful psychosocial/cognitive behavioral program should include sessions on CBT and psychosocial interventions. Several studies that examined CBT sessions, ranging from 8-14 hrs, were found to be beneficial for decreasing anxiety and depression. Complimentary and alternative medicine-based interventions, such as relaxation, guided imagery, and music therapy all support a decrease in dyspnea (Baraniak & Sheffield, 2011; Bauldoff et al., 2002; de Godoy & de Godoy, 2003; Devine & Pearcy, 1996; Gift et al., 1992; Hynninen

et al., 2010; Jonkers et al., 2012; Kunik et al., 2008; Livermore et al., 2010; Singh et al., 2009).

Successful respiration techniques should include breathing technique training interventions. Breathing technique training as an intervention is effective at improving dyspnea symptoms, improving QoL, and exercise tolerance (Güell et al., 2000). Specific breathing technique training interventions consisted of pursed-lip breathing, expiratory abdominal augmentation, and synchronization of thoracic and abdominal movement (Carrieri-Kohlman et al., 2005; Güell et al., 2000; Güell et al., 2006; Karapolat et al., 2007; Lacasse et al., 1997).

Research has found that the inclusion of nutrition as an intervention program can benefit the overall health of people with COPD. It was concluded that when clients were provided with dysphagia management there was a reduction in aspirations of food and liquid, which has been linked to an increase in exacerbations (Moullec et al., 2011; Zhou et al., 2010). While the findings of this research were limited, nutrition has recently been recognized as a valuable tool for managing other health issues; therefore, further research is necessary to determine its benefits regarding COPD specifically.

Implications

Effective interventions for people with COPD should include components of exercise, education, self-management, cognitive behavioral/psychosocial, respiration techniques, and nutrition. The research team determined that if thoroughly educated on the effective interventions in each component, people with COPD have the ability to better manage their disease. A thorough review of the literature has shown evidence for each of these components separately. However, many researchers concluded that combining aspects of each into a comprehensive intervention plan provided the greatest, most sustainable benefits (Moullec et al., 2011; Puhan et al., 2011; Sin, McAlister, Man, & Anthonisen, 2003). Furthermore, if the profession of OT aims to drive interventions founded on evidence-based research, it is imperative that research be more accessible and affordable to all practitioners.

Limitations

Although the intention was to use a single database, OTseeker, using COPD as the only search term is inherently a limitation due to a lack of breadth. The strict inclusionary criteria for evidence established by OTseeker also hinders a full look at valuable work being done in this area, including qualitative research and work representing lower levels of evidence. Finally, while all articles were located through OTseeker, this extensive search yielded only one article that mentioned OT specifically.

Conclusion

Investigators explored the effectiveness of interventions for people with COPD using a thematic synthesis of evidence found through OTseeker. It was concluded that best practice for people with COPD would consist of a multicomponent intervention program. Occupational therapists can use this evidence to thoroughly design well-rounded evidence-based intervention programs to enable people with COPD to live life to its fullest. Given AOTA's vision for

OT practitioners to provide interventions founded on evidence-based research (AOTA, 2007), it is essential that research is affordable and accessible to all practitioners. It was determined that conducting a thematic synthesis of the literature obtained through OTseeker was a feasible way to examine the literature readily available to OT practitioners in order to produce best practice.

References

Alexander, J. L., Phillips, W. T., & Wagner, C. L. (2008). The effect of strength training on functional fitness in older patients with chronic lung disease enrolled in pulmonary rehabilitation. *Rehabilitation Nursing*, *33*(3), 91-97. http://dx.doi.org/10.1002/j.2048-7940.2008.tb00211.x

American Occupational Therapy Association. (2007). AOTA's centennial vision and executive summary. *American Journal of Occupational Therapy*, *61*(6), 613-614. http://dx.doi.org/10.5014/ajot.61.6.613

Baraniak, A., & Sheffield, D. (2011). The efficacy of psychologically based interventions to improve anxiety, depression and quality of life in COPD: A systematic review and meta-analysis. *Patient Education & Counseling*, *83*(1), 29-36. http://dx.doi.org/10.1016/j.pec.2010.04.010

Bauldoff, G., Hoffman, L., Zullo, T., & Sciurba, F. (2002). Exercise maintenance following pulmonary rehabilitation: Effect of distractive stimuli. *Chest*, *122*(3), 948-954.

Beauchamp, M. K., Janaudis-Ferreira, T., Goldstein, R. S., & Brooks, D. (2011). Optimal duration of pulmonary rehabilitation for individuals with chronic obstructive pulmonary disease: A systematic review. *Chronic Respiratory Disease*, *8*(2), 129-140.

Beauchamp, M. K., Evans, R., Janaudis-Ferreira, T., Goldstein, R. S., & Brooks, D. (2013). Systematic review of supervised exercise programs after pulmonary rehabilitation in individuals with COPD. *Chest*, *144*(4), 1124-1133. http://dx.doi.org/10.1378/chest.12-2421

Behnke, M., Taube, C., Kirsten, D., Lehnigk, B., Jorres, R. A., & Magnussen, H. (2000). Home-based exercise is capable of preserving hospital-based improvements in severe chronic obstructive pulmonary disease. *Respiratory Medicine*, *94*(12), 1184-1191. http://dx.doi.org/10.1053/rmed.2000.0949

Bennett, S., Tooth, L., McKenna, K., Rodger, S., Strong, J., Ziviani, S. M.,… Gibson, L. (2003). Perceptions of evidence-based practice: A survey of Australian occupational therapists. *Australian Occupational Therapy Journal*, *50*(1), 13-22. http://dx.doi.org/10.1046/j.1440-1630.2003.00341.x

Bernard, S., Whittom, F., LeBlanc, P., Jobin, J., Belleau, R., Bérubé, C., . . . Maltais, F. (1999). Aerobic and strength training in patients with chronic obstructive pulmonary disease. *American Journal of Respiratory and Critical Care Medicine*, *159*(3), 896-901. http://dx.doi.org/10.1164/ajrccm.159.3.9807034

Bischoff, E., Akkermans, R., Bourbeau, J., van Weel, C., Vercoulen, J., & Schermer, T. (2012). Comprehensive self management and routine monitoring in chronic obstructive pulmonary disease patients in general practice: Randomised controlled trial. *BMJ*, *345*, e7642. http://dx.doi.org/10.1136/bmj.e7642

Blackstock, F., & Webster, K. E. (2007). Disease-specific health education for COPD: A systematic review of changes in health outcomes. *Health Education Research*, *22*(5), 703-717. http://dx.doi.org/10.1093/her/cyl150

Bourbeau, J. (2003). Disease-specific self-management programs in patients with advanced chronic obstructive pulmonary disease: A comprehensive and critical evaluation. *Disease Management & Health Outcomes*, *11*(5), 311-319. http://dx.doi.org/10.2165/00115677-200311050-00004

Brooks, D., Krip, B., Mangovski-Alzamora, S., & Goldstein, R. (2002). The effect of postrehabilitation programmes among individuals with chronic obstructive pulmonary disease. *European Respiratory Journal*, *20*(1), 20-29. http://dx.doi.org/10.1183/09031936.02.01852001

Bucknall, C., Miller, G., Lloyd, S. M., Cleland, J., McCluskey, S., Cotton, M., . . . McConnachie, A. (2012). Glasgow supported self-management trial (GSuST) for patients with moderate to severe COPD: Randomised controlled trial. *BMJ*, *344*, e1060. http://dx.doi.org/10.1136/bmj.e1060

Cambach, W., Chadwick-Straver, R., Wagenaar, R., van Keimpema, A., & Kemper, H. (1997). The effects of a community-based pulmonary rehabilitation programme on exercise tolerance and quality of life: A randomized controlled trial. *European Respiratory Journal*, *10*(1), 104-113. http://dx.doi.org/10.1183/09031936.97.10010104

Cambach, W., Wagenaar, R. C., Koelman, T. W., van Keimpema, T., & Kemper, H. (1999). The long-term effects of pulmonary rehabilitation in patients with asthma and chronic obstructive pulmonary disease: A research synthesis. *Archives of Physical Medicine & Rehabilitation*, *80*(1), 103-111. http://dx.doi.org/10.1016/s0003-9993(99)90316-7

Carrieri-Kohlman, V., Gormley, J. M., Douglas, M. K., Paul, S. M., & Stulbarg, M. (1996). Exercise training decreases dyspnea and the distress and anxiety associated with it: Monitoring alone may be as effective as coaching. *Chest*, *110*(6), 1526-1535. http://dx.doi.org/10.1378/chest.110.6.1526

Carrieri-Kohlman, V., Gormley, J., Eiser, S., Demir-Deviren, S., Nguyen, H., Paul, S., & Stulbarg, M. (2001). Dyspnea and the affective response during exercise training in obstructive pulmonary disease. *Nursing Research*, *50*(3), 136-146. http://dx.doi.org/10.1097/00006199-200105000-00002

Carrieri-Kohlman, V., Nguyen, H. Q., Donesky-Cuenco, D., Demir-Deviren, S., Neuhaus, J., & Stulbarg, M. S. (2005). Impact of brief or extended exercise training on the benefit of a dyspnea self-management program in COPD. *Journal of Cardiopulmonary Rehabilitation and Prevention*, *25*(5), 275-284. http://dx.doi.org/10.1097/00008483-200509000-00009

Chan, A., Lee, A., Suen, L., & Tam, W. (2010). Effectiveness of a Tai chi Qigong program in promoting health-related quality of life and perceived social support in chronic obstructive pulmonary disease clients. *Quality of Life Research*, *19*(5), 653-664. http://dx.doi.org/10.1007/s11136-010-9632-6

Chan, A., Lee, A., Suen, L., & Tam, W. (2011). Tai chi Qigong improves lung functions and activity tolerance in COPD clients: A single blind, randomized controlled trial. *Complementary Therapies in Medicine*, *19*(1), 3-11. http://dx.doi.org/10.1016/j.ctim.2010.12.007

Coventry, P. A., & Gellatly, J. L. (2008). Improving outcomes for COPD patients with mild-to-moderate anxiety and depression: A systematic review of cognitive behavioral therapy. *British Journal of Health Psychology*, *13*(3), 381-400. http://dx.doi.org/10.1348/135910707x203723

Criner, G., Cordova, F., Furukawa, S., Kuzma, A., Travaline, J., Leyenson, V., & O'Brien, G. (1999). Prospective randomized trial comparing bilateral lung volume reduction surgery to pulmonary rehabilitation in severe chronic obstructive pulmonary disease. *American Journal of Respiratory & Critical Care Medicine*, *160*(6), 2018-2027. http://dx.doi.org/10.1164/ajrccm.160.6.9902117

Davis, A. H., Carrieri-Kohlman, V., Janson, S. L., Gold, W. M., & Stulbarg, M. S. (2006). Effects of treatment on two types of self-efficacy in people with chronic obstructive pulmonary disease. *Journal of Pain and Symptom Management*, *32*(1), 60-70. http://dx.doi.org/10.1016/j.jpainsymman.2006.01.012

De Bruin, S. R., Heijink, R., Lemmens, L. C., Struijs, J. N., & Baan, C. A. (2011). Impact of disease management programs on healthcare expenditures for patients with diabetes, depression, heart failure or chronic obstructive pulmonary disease: A systematic review of the literature. *Health Policy*, *101*(2), 105-121. http://dx.doi.org/10.1016/j.healthpol.2011.03.006

De Godoy, D. V., & de Godoy, R. F. (2003). A randomized controlled trial of the effect of psychotherapy on anxiety and depression in chronic obstructive pulmonary disease. *Archives of Physical Medicine and Rehabilitation*, *84*(8), 1154-1157. http://dx.doi.org/10.1016/s0003-9993(03)00239-9

Devine, E. C., & Pearcy, J. (1996). Meta-analysis of the effects of psychoeducational care in adults with chronic obstructive pulmonary disease. *Patient Education & Counseling*, *29*(2), 167-178. http://dx.doi.org/10.1016/0738-3991(96)00862-2

Donesky-Cuenco, D., Nguyen, H., Paul, S., & Carrieri-Kohlman, V. (2009). Yoga therapy decreases dyspnea-related distress and improves functional performance in people with chronic obstructive pulmonary disease: A pilot study. *Journal of Alternative & Complementary Medicine*, *15*(3), 225-234. http://dx.doi.org/10.1089/acm.2008.0389

Döpp, C. M. E., Steultjens, E. M. J., & Radel, J. (2012). A survey of evidence-based practice among Dutch occupational therapists. *Occupational Therapy International*, *19*(1), 17-27. http://dx.doi.org/10.1002/oti.324

Dubouloz, C. J., Egan, M., Vallerand, J., & von Zweck, C. (1999). Occupational therapists' perceptions of evidence based practice. *American Journal of Occupational Therapy*, *53*, 445-453. http://dx.doi.org/10.5014/ajot.53.5.445

Effing, T., Monninkhof, E., van der Valk, P., van der Palen, J., van Herwaarden, C., Partidge, M., & Zielhuis, G. (2003). Self-management education for patients with chronic obstructive pulmonary disease: A systematic review. *Thorax*, *58*(5), 394-398. http://dx.doi.org/10.1136/thorax.58.5.394

Elliott, M., Watson, C., Wilkinson, E., Musk, A., & Lake, F. (2004). Short- and long-term hospital and community exercise programmes for patients with chronic obstructive pulmonary disease. *Respirology*, *9*(3), 345-351. http://dx.doi.org/10.1111/j.1440-1843.2004.00595.x

Emery, C., Schein, R. L,, Hauck, E. R., & MacIntyre, N. R. (1998). Psychological and cognitive outcomes of a randomized trial of exercise among patients with chronic obstructive pulmonary disease. *Health Psychology*, *17*(3), 232-240. http://dx.doi.org/10.1037/0278-6133.17.3.232

Fell, D. W., & Burnham, J. F. (2004). Access is key: Teaching students and physical therapists to access evidence, expert opinion, and patient values for evidence-based practice. *Journal of Physical Therapy Education*, *18*(3), 12-23.

Fernández, A., Pascual, J., Ferrando, C., Arnal, A., Vergara, I., & Sevila, V. (2009). Home-based pulmonary rehabilitation in very severe COPD: Is it safe and useful? *Journal of Cardiopulmonary Rehabilitation & Prevention*, *29*(5), 325-331. http://dx.doi.org/10.1097/hcr.0b013e3181ac7b9d

Finnerty, J. P., Keeping, I., Bullough, I., & Jones, J. (2001). The effectiveness of outpatient pulmonary rehabilitation in chronic lung disease: A randomized controlled trial. *Chest*, *119*(6), 1705-1710. http://dx.doi.org/10.1378/chest.119.6.1705

Gallefoss, F. (2004). The effects of patient education in COPD in a 1-year follow-up randomized, controlled trial. *Patient Education and Counseling*, *52*(3), 259-266. http://dx.doi.org/10.1016/s0738-3991(03)00100-9

Gallefoss, F., & Bakke, P. (2000). Impact of patient education and self-management on morbidity in asthmatics and patients with chronic obstructive pulmonary disease. *Respiratory Medicine*, *94*(3), 279-287. http://dx.doi.org/10.1053/rmed.1999.0749

Gallefoss, F., & Bakke, P. (2002). Cost-benefit and cost-effectiveness analysis of self-management in patients with COPD: A 1-year follow-up randomized, controlled trial. *Respiratory Medicine*, *96*(6), 424-431. http://dx.doi.org/10.1053/rmed.2002.1293

Gallefoss, F., Bakke, P., & Rsgaard, P. (1999). Quality of life assessment after patient education in a randomized controlled study on asthma and chronic obstructive pulmonary disease. *American Journal of Respiratory and Critical Care Medicine*, *159*(3), 812-817. http://dx.doi.org/10.1164/ajrccm.159.3.9804047

Gayle, R. C., Spitler, D. L., Karper, W. B., Jaeger, R. M., & Rice, S. N. (1988). Psychological changes in exercising COPD patients. *International Journal of Rehabilitation Research*, *11*(4), 335-342. http://dx.doi.org/10.1097/00004356-198812000-00002

Gellis, Z. D., Kenaley, B., McGinty, J., Bardelli, E., Davitt, J., & Ten Have, T. (2012). Outcomes of a telehealth intervention for homebound older adults with heart or chronic respiratory failure: A randomized controlled trial. *Gerontologist*, *52*(4), 541-552. http://dx.doi.org/10.1093/geront/gnr134

Gift, A. G., Moore, T., & Soeken, K. (1992). Relaxation to reduce dyspnea and anxiety in COPD patients. *Nursing Research*, *41*(4), 242-246. http://dx.doi.org/10.1097/00006199-199207000-00011

Gormley, J., Carrieri-Kohlman,V., Douglas, M., & Stulbarg, M. (1993). Treadmill self-efficacy and walking performance in patients with COPD. *Journal of Cardiopulmonary Rehabilitation*, *13*(6), 424-431. http://dx.doi.org/10.1097/00008483-199311000-00009

Green, R., Singh, S., Williams, J., & Morgan, M. (2001). A randomized controlled trial of four weeks versus seven weeks of pulmonary rehabilitation in chronic obstructive pulmonary disease. *Thorax*, *56*(2), 143-145. http://dx.doi.org/10.1136/thorax.56.2.143

Güell, R., Casan, P., Belda, J., Sangenis, M., Mornate, F., Guyatt, G. H., & Sanchis, J. (2000). Long-term effects of outpatient rehabilitation of COPD: A randomized trial. *Chest*, *117*(4), 976-983. http://dx.doi.org/10.1378/chest.117.4.976

Güell, R., Resqueti, V., Sangenis, M., Morante, F., Martorell, B., Casan, P., & Guyatt, G. H. (2006). Impact of pulmonary rehabilitation on psychosocial morbidity in with severe COPD. *Chest*, *129*(4), 899-904. http://dx.doi.org/10.1378/chest.129.4.899

Hernández, M., Rubio, T. M., Ruiz, F. O., Riera, H. S., Gil, R. S., & Gómez, J. C. (2000). Results of a home-based training program for patients with COPD. *Chest*, *118*(1), 106-114. http://dx.doi.org/10.1378/chest.118.1.106

Hynninen, M. J., Bjerke, N., Pallesen, S., Bakke, P., & Nordhus, I. (2010). A randomized controlled trial of cognitive behavioral therapy for anxiety and depression in COPD. *Respiratory Medicine*, *104*(7), 986-994. http://dx.doi.org/10.1016/j.rmed.2010.02.020

Incalzi, R. A., Corsonello, A., Trojano, L., Pedone, C., Acanfora, D., Spada, A., . . . Rengo, F. (2008). Cognitive training is ineffective in hypoxemic COPD: A six-month randomized controlled trial. *Rejuvenation Research*, *11*(1), 239-250. http://dx.doi.org/10.1089/rej.2007.0607

Janaudis-Ferreira, T., Hill, K., Goldstein, R., Wadell, K., & Brooks, D. (2009). Arm exercise training in patients with chronic obstructive pulmonary disease: A systematic review. *Journal of Cardiopulmonary Rehabilitation & Prevention*, *29*(5) 277-283. http://dx.doi.org/10.1097/hcr.0b013e3181b4c8d0

Jonkers, C., Lamers, F., Bosma, H., Metsemakers, J., & van Eijk, J. (2012). The effectiveness of a minimal psychological intervention on self-management beliefs and behaviors in depressed chronically ill elderly persons: A randomized trial. *International Psychogeriatrics*, *24*(2), 288-297. http://dx.doi.org/10.1017/s1041610211001748

Karapolat, H., Atasever, A., Atamaz, F., Kirazli, Y., Elmas, F., & Erdinç, E. (2007). Do the benefits gained using a short-term pulmonary rehabilitation program remain

in COPD patients after participation? *Lung*, *185*(4), 221-225. http://dx.doi.org/10.1007/s00408-007-9011-4

Kunik, M. E., Braun, U., Stanley, M. A., Wristers, K., Molinari, V., Stoebner, D., & Orengo, C. A. (2001). One session cognitive behavioural therapy for elderly patients with chronic obstructive pulmonary disease. *Psychological Medicine*, *31*(4), 717-723. http://dx.doi.org/10.1017/s0033291701003890

Kunik, M. E., Veazey, C., Cully, J. A., Souchek, J., Graham, D. P., Hopko, D., . . . Stanley, M. A. (2008). COPD education and cognitive behavioral therapy group treatment for clinically significant symptoms of depression and anxiety in COPD patients: A randomized controlled trial. *Psychological Medicine*, *38*(3), 385-396. http://dx.doi.org/10.1017/s0033291707001687

Lacasse, Y., Wong, E., Guyatt, G., King, D., Cook, D., & Goldstein, R. S. (1996). Meta-analysis of respiratory rehabilitation in chronic obstructive pulmonary disease. *The Lancet*, *348*(9035), 1115-1119. http://dx.doi.org/10.1016/s0140-6736(96)04201-8

Lacasse, Y., Guyatt, G. H., & Goldstein, R. S. (1997). The components of a respiratory rehabilitation program: A systematic review. *Chest*, *111*(4), 1077-1088. http://dx.doi.org/10.1378/chest.111.4.1077

Law, M., & MacDermid, J. (Eds.). (2008). *Evidence-based rehabilitation.* Thorofare, NJ: SLACK Incorporated.

Lemmens, K. M., Nieboer, A. P., & Huijsman, R. (2009). A systematic review of integrated use of disease-management interventions in asthma and COPD. *Respiratory Medicine*, *103*(5), 670-691. http://dx.doi.org/10.1016/j.rmed.2008.11.017

Lewis, K. E., Annandale, J. A., Warm, D. L., Hurlin, C., Lewis, M. J., & Lewis, L. (2010). Home telemonitoring and quality of life in stable, optimised chronic obstructive pulmonary disease. *Journal of Telemedicine and Telecare*, *16*(5), 253-259. http://dx.doi.org/10.1258/jtt.2009.090907

Lewis, K. E., Annandale, J. A., Warm, D. L., Rees, S. E., Hurlin, C., Blyth, H., … Lewis, L. (2011). Does home telemonitoring after pulmonary rehabilitation reduce healthcare use in optimized COPD? A pilot randomized trial. *COPD: Journal of Chronic Obstructive Pulmonary Disease*, *7*(1), 44-50. http://dx.doi.org/10.3109/15412550903499555

Linneberg, A., Rasmussen, M., Buch, T. F., Wester, A., Malm, L., Fannikke, G., & Vest, S. (2012). A randomised study of the effects of supplemental exercise sessions after a 7-week chronic obstructive pulmonary disease rehabilitation program. *The Clinical Respiratory Journal*, *6*(2), 112-119. http://dx.doi.org/10.1111/j.1752-699x.2011.00256.x

Livermore, N., Sharpe, L., & McKenzie, D. (2010). Prevention of panic attacks and panic disorder in COPD. *The European Respiratory Journal*, *35*(3), 557-563. http://dx.doi.org/10.1183/09031936.00060309

Louie, S. W.-S. (2004). The effects of guided imagery relaxation in people with COPD. *Occupational Therapy International*, *11*(3), 145-159. http://dx.doi.org/10.1002/oti.203

Lucas, P. J., Baird, J., Arai, L., Law, C., & Roberts, H. M. (2007). Worked examples of alternative methods for synthesis of qualitative and quantitative research in systematic reviews. *BMC Medical Research Methodology*, *7*(4). http://dx.doi.org/10.1186/1471-2288-7-4

Mador, M., Bozkanat, E., Aggarwal, A., Shaffer, M., & Kufel, T. (2004). Endurance and strength training in patients with COPD. *Chest*, *125*(6), 2036-2045. http://dx.doi.org/10.1378/chest.125.6.2036

Maltais, F., Bourbeau, J., Shapiro, S., Lacasse, Y., Perrault, H., Baltzan, M., . . . Bernard, S. (2008). Effects of home-based pulmonary rehabilitation in patients with chronic obstructive pulmonary disease: A randomized trial. *Annals of Internal Medicine*, *149*(12), 869-878. http://dx.doi.org/10.7326/0003-4819-149-12-200812160-00006

Man, W. D., Polkey, M. I., Donaldson, N., Gray, B. J., & Moxham, J. (2004). Community pulmonary rehabilitation after hospitalisation for acute exacerbations of chronic obstructive pulmonary disease: Randomised controlled study. *BMJ: British Medical Journal*, *329*(7476), 1209. http://dx.doi.org/10.1136/bmj.38258.662720.3a

Mayo Clinic. (2011). *Definition: COPD.* Retrieved from http://www.mayoclinic.com/health/copd/DS00916

McCluskey, A., & Cusick, A. (2002). Strategies for introducing evidence-based practice and changing clinician behavior: A manager's toolbox. *Australian Occupational Therapy Journal*, *49*(2), 63-70. http://dx.doi.org/10.1046/j.1440-1630.2002.00272.x

McCluskey, A., Lovarini, M., Bennett, S., McKenna, K., Tooth, L., & Hoffmann, T. (2006). How and why do occupational therapists use the OTseeker evidence database? *Australian Occupational Therapy Journal*, *53*(3), 188-195. http://dx.doi.org/10.1111/j.1440-1630.2006.00578.x

McKenna, K., Bennett, S., Hoffmann, T., McCluskey, A., Strong, J., & Tooth, L. (2004). OTseeker: Facilitating evidence-based practice in occupational therapy. *Australian Occupational Therapy Journal*, *51*(2), 102-105. http://dx.doi.org/10.1046/j.1440-1630.2004.00421.x

Melnyk, B., Fineout-Overholt, E., Stillwell, S. B., & Williamson, K. M. (2010). Evidence-based practice:

Step by step: The seven steps of evidence-based practice. *American Journal of Nursing*, *110*(1), 51-53. http://dx.doi.org/10.1097/01.naj.0000366056.06605.d2

Monninkhof, E., van der Valk, P., van der Palen, J., van Herwaarden, C., & Zielhuis, G. (2003). Effects of a comprehensive self-management programme in patients with chronic obstructive pulmonary disease. *European Respiratory Journal*, *22*(5), 815-820. http://dx.doi.org/10.1183/09031936.03.00047003

Monninkhof, E., van der Valk, P., van der Palen, J., van Herwaarden, C., Partridge, M. R., & Zielhuis, G. (2003). Self-management education for patients with chronic obstructive pulmonary disease: A systematic review. *Thorax*, *58*(5), 394-398. http://dx.doi.org/10.1136/thorax.58.5.394

Moullec, G., Laurin, C., Lavoie, K., & Ninot, G. (2011). Effects of pulmonary rehabilitation on quality of life in chronic obstructive pulmonary disease patients. *Current Opinion in Pulmonary Medicine*, *17*(2), 62-71. http://dx.doi.org/10.1097/mcp.0b013e328343521c

Mularski, R. A., Munjas, B. A., Lorenz, K. A., Sun, S., Robertson, S. J., Schmelzer, W., . . . Shekelle, P. G. (2009). Randomized controlled trial of mindfulness-based therapy for dyspnea in chronic obstructive lung disease. *The Journal of Alternative and Complementary Medicine*, *15*(10), 1083-1090. http://dx.doi.org/10.1089/acm.2009.0037

Nakamura, Y., Tanaka, K., Shigematsu, R., Nakagaichi, M., Inoue, M., & Homma, T. (2008). Effects of aerobic training and recreational activities in patients with chronic obstructive pulmonary disease. *International Journal of Rehabilitation Research*, *31*(4), 275-283. http://dx.doi.org/10.1097/mrr.0b013e3282fc0f81

Nava, S. (1998). Rehabilitation of patients admitted to a respiratory intensive care unit. *Archives of Physical Medicine and Rehabilitation*, *79*(7), 849-854. http://dx.doi.org/10.1016/s0003-9993(98)90369-0

Ng, B. H. P., Tsang, H. H., Jones, A. M., So, C. T., & Mok, T. W. (2011). Functional and psychosocial effects of health *Qigong* in patients with COPD: A randomized controlled trial. *The Journal of Alternative and Complementary Medicine*, *17*(3), 243-251. http://dx.doi.org/10.1089/acm.2010.0215

Norweg, A. M., Whiteson, J., Malgady, R., Mola, A., & Rey, M. (2005). The effectiveness of different combinations of pulmonary rehabilitation program components: A randomized controlled trial. *Chest*, *128*(2), 663-672. http://dx.doi.org/10.1378/chest.128.2.663

Paz-Díaz, H., de Oca, M., López, J., & Celli, B. R. (2007). Pulmonary rehabilitation improves depression, anxiety, dyspnea and health status in patients with COPD. *American Journal of Physical Medicine & Rehabilitation*, *86*(1), 30-36. http://dx.doi.org/10.1097/phm.0b013e31802b8eca

Pollock, A. S., Legg, L., Langhorne, P., & Sellars, C. (2000). Barriers to achieving evidence-based stroke rehabilitation. *Clinical Rehabilitation*, *14*(6), 611-617. http://dx.doi.org/10.1191/0269215500cr369oa

Puente-Maestu, L., Sanz, M., Sanz, P., Cubillo, J., Mayol, J., & Casaburi, R. (2000). Comparison of effects of supervised versus self-monitored training programmes in patients with chronic obstructive pulmonary disease. *European Respiratory Journal*, *15*(3), 517-525.

Puente-Maestu, L., Sanz, M., Sanz, P. Ruiz, D., Ona, JM, Rodriguez-Hermosa, J., & Whipp, B. (2000). Effects of two types of training on pulmonary and cardiac responses to moderate exercise in patients with COPD. *European Respiratory Journal*, *15*(6), 1026-1032.

Puhan, M. A., Gimeno-Santos, E., Scharplatz, M., Troosters, T., Walters, E., & Steurer, J., (2011). Pulmonary rehabilitation following exacerbations of chronic obstructive pulmonary disease. *Cochrane Database of Systematic Reviews*, *10*. http://dx.doi.org/10.1002/14651858.cd005305.pub3

Rea, H., McAuley, S., Stewart, A., Lamont, C., Roseman, P., & Didsbury, P. (2004). A chronic disease management programme can reduce days in hospital for patients with chronic obstructive pulmonary disease. *Internal Medicine Journal*, *34*(11), 608-614. http://dx.doi.org/10.1111/j.1445-5994.2004.00672.x

Ries, A. L., Ellis, B., & Hawkins, R. W. (1988). Upper extremity exercise training in chronic obstructive pulmonary disease. *Chest*, *93*(4), 688-692. http://dx.doi.org/10.1378/chest.93.4.688

Ringbaek, T. J., Broendum, E., Hemmingsen, L., Lybeck, K., Nielsen, D., Andersen, C., & Lange, P. (2000). Rehabilitation of patients with chronic obstructive pulmonary disease. Exercise twice a week is not sufficient! *Respiratory Medicine*, *94*(2), 150-154. http://dx.doi.org/10.1053/rmed.1999.0704

Romagnoli, M., Dell'Orso, D., Lorenzi, C., Crisafulli, E., Costi, S., Lugli, D., & Clini, E. M. (2006). Repeated pulmonary rehabilitation in severe and disabled COPD patients. *Respiration*, *73*(6), 769-776. http://dx.doi.org/10.1159/000092953

Román, M., Larraz, C., Gómez, A., Ripoll, J., Mir, I., Miranda, E. Z., . . . Esteva, M. (2013). Efficacy of pulmonary rehabilitation in patients with moderate chronic obstructive pulmonary disease: A randomized controlled trial, *BMC Family Practice*,

14(21), 1-9. http://dx.doi.org/10.1186/1471-2296-14-21

Salman, G. F., Mosier, M. C., Beasley, B. W., & Calkins, D. R. (2003). Rehabilitation for patients with chronic obstructive pulmonary disease: Meta-analysis of randomized controlled trials. *Journal of General Internal Medicine*, *18*(3), 213-221. http://dx.doi.org/10.1046/j.1525-1497.2003.20221.x

Sassi-Dambron, D. E., Eakin, E. G., Ries, A. L., & Kaplan, R. M. (1995). Treatment of dyspnea in COPD: A controlled clinical trial of dyspnea management strategies. *Chest*, *107*(3), 724-729. http://dx.doi.org/10.1378/chest.107.3.724

Sedeno, M. F., Nault, D., Hamd, D. H., & Bourbeau, J. (2009). A self-management education program including an action plan for acute COPD exacerbations. *COPD: Journal of Chronic Obstructive Pulmonary Disease*, *6*(5), 352-358. http://dx.doi.org/10.1080/15412550903150252

Sin, D. D., McAlister, F. A., Man, S. F. P., & Anthonisen, N. R. (2003). Contemporary management of chronic obstructive pulmonary disease: Scientific review. *JAMA: Journal of the American Medical Association*, *290*(17), 2301-2312. http://dx.doi.org/10.1001/jama.290.17.2301

Singh, V. P., Rao, V., Prem, V., Sahoo, R. C., & Keshav, P. K. (2009). Comparison of the effectiveness of music and progressive muscle relaxation for anxiety in COPD: A randomized controlled pilot study. *Chronic Respiratory Disease*, *6*(4), 209-216.

Soysa, S., McKeough, Z., Spencer, L., & Alison, J. (2012). Effects of maintenance programs on exercise capacity and quality of life in chronic obstructive pulmonary disease. *Physical Therapy Reviews*, *17*(5), 335-345. http://dx.doi.org/10.1179/1743288x12y.0000000033

Strijbos, J. H., Postma, D. S., van Altena, R., Gimeno, F., & Koëter, G. H. (1996). Feasibility and effects of a home-care rehabilitation program in patients with chronic obstructive pulmonary disease. *Journal of Cardiopulmonary Rehabilitation and Prevention*, *16*(6), 386-393. http://dx.doi.org/10.1097/00008483-199611000-00008

Tang, C. Y., Blackstock, F., Clarence, M., & Taylor, N. (2012). Early rehabilitation exercise program for inpatients during an acute exacerbation of chronic obstructive pulmonary disease: A randomized controlled trial. *Journal of Cardiopulmonary Rehabilitation & Prevention*, *32*(3), 163-169. http://dx.doi.org/10.1097/hcr.0b013e318252f0b2

Taylor, S. J., & Bogdan, R. (1998). *Introduction to qualitative research methods: A guidebook and resource* (3rd ed.). New York: Wiley.

Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, *8*(45), 1-10. http://dx.doi.org/10.1186/1471-2288-8-45

Troosters, T., Gosselink, R., & Decramer, M. (2000). Short- and long-term effects of outpatient rehabilitation in patients with chronic obstructive pulmonary disease: A randomized trial. *The American Journal of Medicine*, *109*(3), 207-212. http://dx.doi.org/10.1016/s0002-9343(00)00472-1

Upton, D., Stephens, D., Williams, B., & Scurlock-Evans, L. (2014). Occupational therapists' attitudes, knowledge, and implementation of evidence-based practice: A systematic review of published research. *British Journal of Occupational Therapy*, *77*(1), 24-38. http://dx.doi.org/10.4276/030802214x13887685335544

U.S. Department of Health and Human Services, National Heart, Lung, and Blood Institute. (2012). *What is COPD?* Retrieved from www.nhlbi.nih.gov/health/health-topics/topics/copd/

Van Gestel, A., Kohler, M., Steier, J., Teschler, S., Russi, E., & Teschler, H. (2012). The effects of controlled breathing during pulmonary rehabilitation in patients with COPD. *Respiration*, *83*(2), 115-124. http://dx.doi.org/10.1159/000324449

Vieira, D., Maltais, F., & Bourbeau, J. (2010). Home-based pulmonary rehabilitation in chronic obstructive pulmonary disease patients. *Current Opinion in Pulmonary Medicine*, *16*(2), 134-143. http://dx.doi.org/10.1097/mcp.0b013e32833642f2

Watson, P. B., Town, G. I., Holbrook, N., Dwan, C., Toop, L. J., & Drennan, C. J. (1997). Evaluation of a self-management plan for chronic obstructive pulmonary disease. *European Respiratory Journal*, *10*(6), 1267-1271. http://dx.doi.org/10.1183/09031936.97.10061267

Welch, A., & Dawson, P. (2006). Closing the gap: Collaborative learning as a strategy to embed evidence within occupational therapy practice. *Journal of Evaluation in Clinical Practice*, *12(2)*, 227-238. http://dx.doi.org/10.1111/j.1365-2753.2005.00622.x

White, R., Rudkin, S., Harrison, S., Day, K., & Harvey, I. (2002). Pulmonary rehabilitation compared with brief advice given for severe chronic obstructive pulmonary disease. *Journal of Cardiopulmonary Rehabilitation*, *22*(5), 338-344. http://dx.doi.org/10.1097/00008483-200209000-00006

Wijkstra, P., Van Altena, R., Kraan, J., Otten, V., Postma, D., & Koëter, G. (1994). Quality of life in patients with

chronic obstructive pulmonary disease improves after rehabilitation at home. *The European Respiratory Journal*, *7*(2), 269-273. http://dx.doi.org/10.1183/09031936.94.07020269

Wu, H.-S., Lin, L.-C., Wu, S.-C., & Lin, J.-G.. (2007). The psychologic consequences of chronic dyspnea in chronic pulmonary obstruction disease: The effects of acupressure on depression. *The Journal of Alternative and Complementary Medicine*, *13*(2), 253-262. http://dx.doi.org/10.1089/acm.2006.5342

Zhou, Y., Hu, G., Wang, D., Wang, S., Wang, Y., Liu, Z., . . . Ran, P. (2010). Community based integrated intervention for prevention and management of chronic obstructive pulmonary disease (COPD) in Guangdong, China: Cluster randomised controlled trial. *BMJ*, *341*, c6387. http://dx.doi.org/10.1136/bmj.c6387