Behaviour Research and Therapy 87 (2016) 142–154

Contents lists available at ScienceDirect

Behaviour Research and Therapy

journal homepage: www.elsevier.com/locate/brat

Psychological treatment of comorbid asthma and panic disorder in Latino adults: Results from a randomized controlled trial

Jonathan M. Feldman [a, b, *], Lynne Matte [a], Alejandro Interian [c], Paul M. Lehrer [d], Shou-En Lu [e], Bari Scheckner [a], Dara M. Steinberg [a], Tanya Oken [a], Anu Kotay [f], Sumita Sinha [g], Chang Shim [h]

[a] Ferkauf Graduate School of Psychology, Yeshiva University, 1300 Morris Park Avenue, Rousso Building, Bronx, NY 10461, USA
[b] Department of Pediatrics, Albert Einstein College of Medicine, 1300 Morris Park Avenue, Bronx, NY 10461, USA
[c] Veterans Affairs New Jersey Health Care System, 151 Knollcroft Road, Lyons, NJ 07939, USA
[d] Department of Psychiatry, Rutgers - Robert Wood Johnson Medical School, 671 Hoes Lane, Piscataway, NJ 08854, USA
[e] Rutgers – School of Public Health, 683 Hoes Lane West, Piscataway, NJ 08854, USA
[f] Department of Family and Social Medicine, Montefiore Medical Center/Albert Einstein College of Medicine, 3544 Jerome Avenue, Bronx, NY 10467, USA
[g] Department of Medicine (Pulmonary Medicine), Montefiore Medical Center/Albert Einstein College of Medicine, 3332 Rochambeau Avenue, Bronx, NY 10467, USA
[h] Department of Medicine (Pulmonary Medicine), Jacobi Medical Center/Albert Einstein College of Medicine, 1400 Pelham Parkway South, Bronx, NY 10461, USA

ARTICLE INFO

Article history:
Received 2 March 2016
Received in revised form
15 September 2016
Accepted 16 September 2016
Available online 17 September 2016

Keywords:
Asthma
Panic
Patient compliance
Latinos
Cognitive behavior therapy
Relaxation

ABSTRACT

Confusion between panic and asthma symptoms can result in serious self-management errors. A cognitive behavior psychophysiological therapy (CBPT) intervention was culturally adapted for Latinos consisting of CBT for panic disorder (PD), asthma education, differentiation between panic and asthma symptoms, and heart rate variability biofeedback. An RCT compared CBPT to music and relaxation therapy (MRT), which included listening to relaxing music and paced breathing at resting respiration rates. Fifty-three Latino (primarily Puerto Rican) adults with asthma and PD were randomly assigned to CBPT or MRT for 8 weekly sessions. Both groups showed improvements in PD severity, asthma control, and several other anxiety and asthma outcome measures from baseline to post-treatment and 3-month follow-up. CBPT showed an advantage over MRT for improvement in adherence to inhaled corticosteroids. Improvements in PD severity were mediated by anxiety sensitivity in CBPT and by depression in MRT, although earlier levels of these mediators did not predict subsequent improvements. Attrition was high (40%) in both groups, albeit comparable to CBT studies targeting anxiety in Latinos. Additional strategies are needed to improve retention in this high-risk population. Both CBPT and MRT may be efficacious interventions for comorbid asthma-PD, and CBPT may offer additional benefits for improving medication adherence.

Asthma and panic disorder (PD) share strikingly similar phenomenology. Respiratory related symptoms, such as dyspnea, dizziness, chest tightness, choking and smothering sensations are common in both disorders. The overlap in symptoms between asthma and panic may lead an individual to mistake a panic attack as an asthma attack. This confusion may then lead to excessive use of rescue medications and further worsen tremor, tachycardia, and anxiety, the common side effects of this medication (Horikawa, Udaka, Crow, Takayama, & Stein, 2014). This may trigger a maladaptive cycle of using rescue medications to treat respiratory anxiety symptoms, mistaken as asthma, thus further increasing feared bodily sensations and panic (Feldman, Giardino, Lehrer, 2000; Rihmer, 1997). Alternatively, dismissing an asthma attack as a panic attack can have fatal consequences.

PD and asthma occur together in individuals at a high rate. A 20-year longitudinal, community-based study showed that adults with asthma were 4.5 times more likely to develop PD than adults without asthma (Hasler et al., 2005). Conversely, PD is also

* Corresponding author. Ferkauf Graduate School of Psychology, Yeshiva University, 1300 Morris Park Avenue, Rousso Building, Bronx, NY 10461, USA.
E-mail address: Jonathan.Feldman@einstein.yu.edu (J.M. Feldman).

http://dx.doi.org/10.1016/j.brat.2016.09.007
0005-7967/

associated with later development of asthma (Alonso et al., 2014). Patients with asthma and PD have greater health care use related to asthma, poorer asthma quality of life, and greater report of rescue medications than asthma patients without PD, despite no differences on pulmonary function (Feldman, Lehrer, Borson, Hallstrand, & Siddique, 2005). PD in asthma patients is prospectively associated with worse asthma control (Favreau, Bacon, Labrecque, & Lavoie, 2014; Hasler et al., 2005). No prior studies have examined adherence to inhaled corticosteroids (ICS) for treatment of asthma in patients with PD. As patients increase adherence to ICS, asthma control should improve and, in turn, anxiety focused on asthma.

Puerto Ricans have the highest asthma prevalence, morbidity and mortality rates for asthma across all other ethnic groups (Akinbami, Moorman, Liu, 2011; NHLBI, 2013). Puerto Ricans with asthma have the highest rate (21%) of PD compared to other ethnic groups, and rates of PD are even higher among Spanish-speaking patients (Feldman et al., 2010). Therefore, Puerto Ricans are the group most at risk for asthma -PD comorbidity and in need of interventions to reduce morbidity of both conditions. However, Latinos and other ethnic minorities have been severely underrepresented in RCTs of PD (Mendoza, Williams, Chapman, & Powers, 2012). Given the unfeasibility of developing treatments that account for all of the cultural diversity in the United States, recommendations suggest drawing from the knowledge base of existing treatments and adapting them to meet the needs of specific racial/ethnic groups (Miranda, Nakamura, & Bernal, 2003).

Special care must be given when treating patients with asthma and PD because what may be therapeutic for one condition can, under some circumstances, worsen the other condition. Certain interoceptive exposure exercises, such as voluntary hyperventilation, may produce airway obstruction in those with asthma (Meuret & Ritz, 2010) due to increased airway cooling effects (Nielsen & Bisgaard, 2005). Patients with asthma are advised to avoid allergens and other airway irritants, whereas patients with PD are advised to expose themselves to triggers for panic, which may be confusing for patients without adequate instruction. The high rate of agoraphobia (Feldman et al., 2005) and phobic avoidance (Yellowlees & Kalucy, 1990) in patients with PD and asthma may have started as appropriate attempts to eliminate asthma triggers (e.g., avoidance of places with cigarette smoke exposure), which then generalized to excessive avoidance behavior due to fear of panic attacks (e.g., avoidance of all public places). Cognitive restructuring for PD is also complicated by the frightening and life-threatening nature of asthma symptoms. For example, potentially catastrophic consequences can occur by mislabeling asthma symptoms as simply being panic-related and engaging in only cognitive restructuring.

Anxiety sensitivity, which measures fearful beliefs about the consequences of anxiety, may be a key construct to target in the treatment of this population. Patients with asthma and PD have greater anxiety sensitivity and fear of bodily sensations than asthma patients without PD (Carr, Lehrer, Rausch, & Hochron, 1994). The physical concerns domain of anxiety sensitivity is associated with worse asthma outcomes including asthma control, quality of life, and pulmonary function (Avallone, McLeish, Luberto, & Bernstein, 2012; McLeish, Luberto, & O'Bryan, 2016). Improvements in PD severity with CBT are mediated by reductions in catastrophic cognitions with the strongest effects linked to physical catastrophic cognitions (Hofmann et al., 2007). Anxiety sensitivity also mediates improvements in PD severity with cognitive therapy (Meuret, Rosenfield, Seidel, Bhaskara, & Hofmann, 2010). Both the physical and cognitive components of anxiety sensitivity are especially relevant to Caribbean Latinos with anxiety. Anxiety sensitivity of these types of experiences predicts the frequency of *ataques de nervios*, which is a well-known cultural idiom of distress that is more prevalent within this cultural group (Hinton, Lewis-Fernandez, & Pollack, 2009).

Cognitive behavior therapy (CBT) has shown promising results for the treatment of asthma and PD, although there are limited data in this area. We developed a combined treatment (Feldman et al., 2000; Lehrer et al., 2008) consisting of asthma education (Kotses et al., 1995; NHLBI, 2007), panic control therapy (Craske & Barlow, 2006), and progressive muscle relaxation (Jacobson, 1938). The treatment was adapted specifically for comorbid asthma-PD by training patients to discriminate between asthma and panic symptoms, aided by the use of a peak flow meter, to use the correct treatment strategy. Participants ($n = 10$) in an uncontrolled study who received 8 sessions of treatment showed decreases on PD severity and use of rescue medication for asthma, and improvements in asthma symptoms and asthma quality of life (Lehrer et al., 2008). A separate study found that combining group CBT ($n = 15$) with asthma education was associated with decreases in panic attacks, general anxiety, and anxiety sensitivity in comparison to a wait-list control group ($n = 10$) at 6-month follow-up, although improvements in asthma outcomes were not maintained (Ross, Davis, & MacDonald, 2005). Asthma patients who completed an individualized asthma program that included cognitive and behavioral techniques reported improvements in self-reported medication adherence across 3-month follow-up compared with a wait list control (Put, van den Bergh, Lemaigre, Demedts, & Verleden, 2003). CBT combined with asthma education has also been shown to reduce illness-specific panic-fear compared to treatment as usual in patients with asthma and high levels of anxiety symptoms (Parry et al., 2012).

In the current trial, we substituted heart rate variability (HRV) biofeedback for progressive muscle relaxation due its large effects on improvements on pulmonary function (Lehrer et al., 2004). HRV biofeedback stimulates resonance characteristics of the cardiovascular system caused by a constant rhythm in heart rate and blood pressure due to baroreflex activity (Vaschillo, Lehrer, Rishe, & Konstantinov, 2002). When stimulated by breathing at the resonance frequency, which typically is reflected in oscillations with a frequency between 4.5 and 6.5 cycles per minute, the amplitude of both baroreflex activity and respiratory sinus arrhythmia are greatly increased, and heart rate oscillations move into perfect phase (0°) with breathing (Vaschillo et al., 2002). Frequent high-amplitude stimulation of the baroreflex increases baseline baroreflex gain (Lehrer et al., 2003), thus improving activity in an important reflex that modulates blood pressure, with extension to all autonomic reactivity. Although the exact mechanism by which HRV biofeedback helps asthma has not been demonstrated, theoretical mechanisms include improved respiratory gas exchange efficiency (Hayano, Yasuma, Okada, Mukai, & Fujinami, 1996), stretching of the airways through slower and deeper breathing, decreased tendency to hyperventilate, and reduction of stress and attendant autonomic hyperreactivity (Lehrer & Gevirtz, 2014). We will refer to this treatment arm as cognitive behavior psychophysiological therapy (CBPT).

We selected music therapy and paced breathing at each participant's average respiration rate for the comparison active treatment, hereafter called music relaxation therapy (MRT). The rationale for music therapy was to serve as a non-specific, general relaxation intervention. Paced breathing at participants' average resting respiration rate provided an active control for HRV biofeedback in order to match the focus on breathing at specific rates in both groups. Listening to self-selected relaxing music following stressors reduces negative emotional states and physiological arousal (Labbe, Schmidt, Babin, & Pharr, 2007). Music therapy has resulted in lower depressive symptoms (Chan, Chan, Mok, Tse, & Yuk, 2009), although no studies have examined the efficacy