PSYCHOPHYSIOLOGY OF RESPIRATORY DISEASE: CLINICAL CONSIDERATIONS FOR THE ADVANCED PRACTICE NURSE

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Abstract. The purpose of this article is to describe the psychophysiology of dyspnea in chronic obstructive pulmonary disease (COPD), identify the unique impact of respiratory disease on the female patient, and discuss the relationship of anxiety and depression in disease manifestation. Current COPD assessment and treatment guidelines published by the United States Department of Health and Human Services, the World Health Organization as well as the National Institute for Health and Care Experience (NICE) will be presented along with implications for the Advanced Practice Nurse (APN). Practitioners treat COPD patients with advanced physiological complications along with psychological comorbidities that worsen the disease perception and progression. Therefore, a recommendation will be made to integrate assessment and evaluation of psychological comorbidities in COPD patients, with particular consideration given to the female patient. Utilizing a holistic, integrated treatment plan will serve to enhance patient care, alleviate disease burden and impact overall quality of life in the patient with COPD.

Keywords chronic obstructive pulmonary disease (COPD), dyspnea, psychophysiology, depression, anxiety, gender

1 Introduction

Chronic respiratory diseases, such as chronic obstructive pulmonary disease (COPD), are the third leading cause of death in America, behind heart disease and cancer (Centers for Disease Control and Prevention, United States Department of Health and Human Services (CDC), 2012). COPD is a term that refers to a large group of deteriorating respiratory diseases that interfere with breathing due to airway obstruction (American Lung Association (ALA), 2013a). COPD limits quality of life (QOL) by preventing or limiting every day activities such as working, activities requiring physical exertion, household chores and participation in family activities (ALA, 2013a). Consequently, individuals with COPD frequently report lower than normal health-related QOL, while also demonstrating increased levels of anxiety and depression (Arne et al., 2009), along with decreased capacity for exercise, decreased physical activity levels and non-completion of self-care activities of daily living (ADLs) (Pitta et al., 2006). HRQoL encompasses the more subjective influence of the disease on the quality of life and how overall QOL in turn affects personal mental and physical health (Ketelaars et al., 1996; CDC, 2000). The deleterious effects of COPD on QOL can be partially attributed to the associated sensation of difficulty breathing, or dyspnea (Burgel et al., 2013). Dyspnea has been rated as one of the most significant contributors to diminished HRQoL in patients with COPD (Nishimura et al., 2008).

This article utilizes available psychophysiological evidence to provide Advanced Practice Nurses (APNs) an overview of the need for assessment of psychological comorbidities in patients with chronic obstructive pulmonary disease (COPD) in order to better manage patient outcomes and improve quality of life. Further, this article will describe the role dyspnea plays in perception of health-related quality of life (HRQoL), the unique psychological comorbidities often noted in female COPD patients, current practice guidelines related to COPD care, and implications for the Advanced Practice Nurse (APN).

2 Dyspnea

To fully examine the effects of dyspnea on the patient, it is first necessary to understand the neurological processing of negative (aversive) respiratory sensations. During a COPD exacerbation, the respiratory system is presented with a ‘load’ that disrupts normal bodily homeostasis and must be physically overcome or adapted to. An example of a respiratory load is an increase in lower airway resistance, accumulation of mucus, or bronchial spasms. There are two primary cognitive components to the perception of increased respiratory loads: discriminative and affective (Davenport & Vovk, 2009). Initially, the brain discriminates the respiratory sensation through a complex interaction among multiple respiratory afferent groups and brainstem centers that control respiratory motor drive (Davenport & Vovk, 2009). This is the somatosensory event related to cognitive awareness of breathing disruption.

During the following affective phase, the individual qualifies how he or she feels as a result of the aversive respiratory event and if the sensation is unpleasant. In experimental settings, subjects seldom report unpleasant evaluations of short or single breath loads, but this changes with persistent dyspnea and results in increases in unpleasant affective evaluation (Alexander-Miller & Davenport, 2010). Extremely large resistive loads have been shown to induce fear of suffocation and increased discomfort (Pappens, Smets, Van den Bergh & Van Diest, 2012a). The nature of this affective phase is highly variable across individuals.
Females tend to magnify their perception of extended respiratory loads (Alexander-Miller & Davenport, 2010), while highly anxious subjects have reduced respiratory sensory gating leading to altered perception (Chan et al., 2012).

Due to the progressive and chronic nature of COPD, patients often experience sustained, undesirable respiratory sensations that lead to discomfort and altered perception of their breathing. These sensations vary by individual, based upon gender, previous experiences, and levels of anxiety (Alexander-Miller & Davenport, 2010; Chan et al., 2012).

Individuals who report extreme “fear of suffocation” experience increased physical discomfort associated with dyspnea (Pappens et al., 2012a). These individuals tend to place greater strain on respiratory muscles by increasing ventilatory response to loads. This added physiological strain results in a mutual reinforcement of both fear and maladaptive breathing (Pappens et al., 2012b).

Some individuals react with extreme fear to respiratory stimulation, such as increased carbon dioxide, which can trigger a hypersensitive fear network (Nardi, Freire & Zin, 2009; Sinka, Papp & Gorman, 2000). Studies have shown that COPD patients experience restricted ability to perform ADLs and this fear of dyspnea leads to avoidance of activities (Janssens et al., 2011; Mikkelsen et al., 2004; Ng et al., 2007; Yohannes, Baldwin & Connolly, 2000; Zoellner et al., 2012; Zoellner et al., 2014).

Essentially, individuals with chronic respiratory disease learn to fear disease exacerbations, specifically dyspnea (Janssens et al., 2011). This fear is self-potentiating and eventually becomes limiting as individuals avoid activities (such as social events, engaging in physical activity or ADLs, or even leaving their home), potentially contributing to further social isolation, physical de-conditioning and reduced QOL (Thomas, Decramer & O’Donnell, 2013).

3 Psychological Comorbidities

Furthering the physiological detrimental effects and morbidity of chronic respiratory disease is the added burden of psychological comorbidities. Depression and anxiety are comorbidities frequently associated with COPD (Kunik et al., 2005), with prevalence estimates generally higher than other advanced chronic diseases (Maurer et al., 2008). These psychological comorbidities associated with COPD are often left untreated or under-treated (Cully et al., 2006), leading to decreased QOL, increased rates of hospitalization, and reductions in treatment adherence (Stapleton et al., 2005).

It is still unclear what the exact relationship direction is between depression and anxiety in COPD, but a recent study found that depression adversely affects COPD prognosis, resulting in increased exacerbation risk and possibly death (Atlantis et al., 2013). Management of depression and anxiety may improve QOL while increasing capacity for physical activity and treatment adherence (Stapleton et al., 2005; Light et al., 1985). COPD has also been shown to contribute to the emergence and exacerbation of psychiatric disorders such as depression and anxiety and may decrease treatment adherence by diverting cognitive resources (Turan, Yemek & Ili, 2013).

4 Unique impact on the female patient

Female COPD mortality has been on a steady rise and has quadrupled since 1980 (ALA, 2013b). Since 2000, COPD has claimed more female than male lives, with women making up 53% of COPD deaths (CDC, 2012). The impact of COPD on women in particular is understudied, despite evidence showing gender-based differences in treatment response (Haave, Skumlien & Hylland, 2008; Varkey, 2004).

COPD more adversely affects women than it does men, and women with COPD have higher levels of anxiety and depression (Di Marco et al., 2006). The quality of life for women is impacted earlier in life than their male counterparts with similar disease severity (de Torres et al., 2006; Naberan et al., 2012). This may be attributed to increases in subjective feelings of shortness of breath, which has a strong correlation for QOL (van Haren-Willems & Heijdra, 2010). Women show more variance in reports of symptom intensity (particularly dyspnea) than males with similar disease progression and also have lower exercise capacity (de Torres et al., 2006). An in-depth 2014 study by Raherison et al. found significant gender differences impacting the female patient, particularly from chronic sputum. Females reported lower QOL than men and were more impacted by chronic cough, despite lower GOLD-staged disease severity (Raherison et al., 2014). The Global Initiative for Chronic Obstructive Lung Disease (GOLD) provides evidence-based guidelines for assessment, diagnosis, management, diagnostic spirometry and staging criteria of airflow limitation in the severity of COPD (GOLD, 2014).

Women also feel that they experience diagnostic delays, have trouble reaching their physician, and believe their treatment time with a physician to be insufficient (Martinez et al., 2012). The delay in diagnosis for female patients can be credited to COPD being historically thought of as an “older white man’s disease.” Although the disease remains undiagnosed in women much longer than for men, COPD continues to develop rapidly in women and must be addressed in primary care. The ALA (2013b) called for “taking action” against rising COPD morbidity and mortality, encouraging healthcare providers to adopt practices and policies to improve diagnosis and screening of COPD in women.

5 Clinical COPD Guidelines

APNs use a process of diagnostic reasoning to assess, evaluate and recommend treatment for the patient. The four major concepts addressed in all current assessment guidelines are diagnosis, evaluation, management, and treatment. Together, each category enhances the other by integrating available patient evidence to facilitate optimal care by the provider while lessening the chance of misdiagnosis and biases. Considering the consequences of dyspnea on QOL and subsequent psychological effects, it is recommended that an early psychological evaluation including screening for anxiety and depression be assimilated into each of the four concepts of care. Raherison et al. (2014) recommend management of COPD should incorporate psychological distress and socioeconomic status, particularly in women who are unemployed and living alone, and consider the specific impact of chronic sputum in women.

The National Institute for Health and Care Experience (NICE) and GOLD have published professional guidelines for COPD assessment and coexisting comorbidities (NICE, 2014; GOLD, 2014). NICE guideline 91 highlights the importance of early identification of patients with a chronic health condition, such as COPD, who are at increased risk for depression and functional impairment (NICE, 2014). The guidelines address disease-associated mood fluctuations, loss of pleasure in activities, pain, functional impairment and disability that can increase the risk of depression and anxiety. Cote and Chapman (2009) report that psychiatric disorders such as depression are three times more common in women with COPD than in men with COPD. Women admit to these manifestations while reporting their chief complaint to a provider (Cote & Chapman, 2009). Therefore, assessing for anxiety and depression in women with COPD and implementing the standards set forth in the GOLD and NICE guidelines will enhance the quality of care provided by APNs for the female COPD patient.
6 Final Commentary

While clinical guidelines are well established to diagnose and treat COPD, practice guidelines target isolated diseases and do not encompass comorbidities, presenting a challenge in COPD care (García-Olmos et al., 2013). Like many chronic diseases, COPD affects multiple aspects of the patient and varies by each patient. Vigilant review of clinical practice guidelines is necessary to optimize evidence-based care. Providers should be alert to the high-risk of psychological comorbidities and screen patients for depression and anxiety upon initial presentation (Maurer et al., 2008). Early psychological assessment and intervention can be accomplished with addition of HRQoL evaluation using the VQ-11 scale, a short questionnaire completed by the patient, which provides a reliable COPD-specific HRQoL measure and is recommended for routine practice (Ninot et al., 2013). Early recognition, supportive care and treatment can ease the burden of psychological comorbidities in patients with COPD.

A holistic, integrated treatment plan will serve to optimize patient outcomes, decrease the burden of symptoms, prevent/manage exacerbations, slow disease progression, reduce disease morbidity and overall improve the HRQoL in the patient with COPD. In summary, psychological and perceptual assessment should evolve as a new priority in clinical assessment of COPD patients. Females with COPD demonstrate increased physical and psychological burden from their disease, yet there is no specialized treatment plan to address this population. Future research should aim to quantify the predictors of psychological comorbidities in COPD patients and develop guidelines to address these factors.

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References


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