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Depression Scores in Males and Females with COPD

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Depression Scores in Males and Females with COPD

by

Cynthia Southers

A thesis submitted to the faculty of
Gardner-Webb University Hunt School of Nursing
in partial fulfillment of the requirements for the
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Abstract

The purpose of this study was to determine the effect of participation in a pulmonary rehabilitation (PR) program on depression scores in persons with Chronic Obstructive Pulmonary Disease (COPD) and if there is a difference between males and females in depression scores prior to and following participation in a pulmonary rehabilitation program. The literature review supported multiple factors on how participating in a pulmonary rehabilitation program can have a positive effect on depression scores. The study utilized a descriptive design with a retrospective chart review. The quantitative descriptive design identified variables and examined the differences in males and females with COPD using pre- and post-depression scores from the Patient Health Questionnaire (PHQ-9) currently utilized in the pulmonary rehabilitation center. The research was guided by Virginia Henderson's framework for nursing need theory. The data did show a significant difference between males and females in none to mild depression level. Males and female scores in the moderate to severe level of depression revealed no significant differences.

Keywords: males, females, depression scores, pulmonary, rehabilitation, COPD, depression, PHQ-9 questionnaire, and education.

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CHAPTER I

Introduction

Chronic obstructive pulmonary disease (COPD) is a respiratory disorder largely caused by smoking and characterized by progressive, partially reversible airway obstruction and lung hyperinflation, systemic manifestations, and increasing frequency and severity of exacerbations (Zakrisson, Theander, & Anderzen-Carisson, 2014). COPD includes two types of lung disease: emphysema and chronic bronchitis with symptoms that can cause difficulty breathing, and shortness of breath due to airflow blockage, which means breathing may take extra effort.

COPD is a leading cause of chronic morbidity worldwide and can result from inhaling pollutants including but not limited to smoking (cigarettes, pipes, cigars, etc.) and second-hand smoke. Fumes, chemicals, and dust found in many work environments can be contributing factors for many individuals who develop COPD. Genetics can be another cause in an individual's development of COPD—even if the person has never smoked or been exposed to strong lung irritants in the workplace.

With COPD, air gets trapped in the lungs leading to a reduction in the number of capillaries in the alveoli and an impairment of the exchange of oxygen and carbon dioxide between the alveoli and the bloodstream. Eventually carbon dioxide rises and reduces the oxygen level in the body (Legato, 2010). This effect of COPD may impair breathing, increasing anxiety leading to additional difficulty in breathing. Most clinical signs in COPD patients (women and men) are not present until the disease is moderate in severity and can include barrel chest, prominent use of accessory muscles, weight loss,

use of abdominal muscle to breathe, peripheral edema, and raised jugular venous pressure (Bellamy & Booker, 2011).

The disease can affect all aspects of a patient's life and cause significant disability and handicaps depending on severity and treatment of the disease. With the clinical signs of COPD, depression may be present due to the patient's activity limitations originating from the disease. Treatment and education can minimize symptoms, decrease the occurrence and severity of exacerbations, and increase exercise tolerance (Center for Disease Control and Prevention [CDC], 2015).

According to American Thoracic Society (2013), pulmonary rehabilitation participants can learn breathing techniques, medications, diet, relaxation, oxygen, travel, how to do everyday tasks with less shortness of breath, and how to stay healthy to avoid COPD exacerbations. Participants can learn to cope with changes related to COPD including but not limited to depression, panic, anxiety, and others. Another benefit of PR is the opportunity to meet individuals with COPD who have many of the same experiences and concerns. Patients can learn to be in control of their breathing. Most programs meet two to three times a week and last four to twelve weeks or more. COPD affects a patient's life at various degrees and on many levels. Educating and informing the patient of the disease provides knowledge and tools to handle their lives more effectively by becoming pro-active. Pulmonary Rehabilitation (PR) provides information and can be a treatment for the disease.

From 2007 to 2009, 7.4 million women developed COPD compared to 4.4 million men. Tobacco smoking is believed to be the leading cause of 85-90% of all COPD; however, women may not report tobacco smoking as often as men. COPD increased in

men by 25% between 1990 and 1997 while women had an increase of 69%. The rise of COPD among men leveled out in mid-1990's, but continued to rise in women (Legato, 2010).

The research study will be conducted at a Regional Healthcare System. The cardiac/pulmonary rehabilitation center is part of the teaching and research hospital in a county serving a population of 297,302 (Demographics & Data, 2015). The regional hospital includes 500+ physicians, specialists, sub-specialists and 5,600+ dedicated employees. The Pulmonary Rehab program consists of 12 weeks of one-hour sessions two times a week. Between October 2015 and March 2016, 456 COPD patients enrolled in the PR program at the facility.

Anxiety and depression in COPD patients are important concerns to address. The manifestation of COPD symptoms differs between women and men. Though they may experience similar symptoms, the perception and/or descriptions could vary. Women and men may experience different symptoms due to differences in their physiology and biology. Research on gender differences in the diagnosis and management of COPD is still in its infancy, but continues to be addressed by researchers and clinicians. With continued research it will ultimately result in better care for men and women with COPD (Camp & Goring, 2007).

Significance

PR provides participants with information and guidance to pro-actively manage their health and lessen the anxiety of living with COPD. Each person is evaluated by the various disciplines that comprise the PR team, which can include some combination of

doctors, nurses, physical therapists, occupational therapists, respiratory therapists, nutritionists, and exercise specialists.

The questionnaire was developed by Robert L. Spitzer, MD, Janet B. W. Williams, DSW and Kurt Kroenke, MD in the mid 1990's. The PHQ-9 is a multipurpose instrument for screening, diagnosing, monitoring, and measuring severity of depression. The exam can be self-administered or from the clinician. Once the questionnaire has been completed it is scored immediately by the clinician. Since it is brief, it is used widely by clinicians. The diagnostic validity of the PHQ-9 was established in studies encompassing eight primary care and seven obstetrical clinics (Kroenke, Spitzer, & Williams, 2001). Evaluations may include the assessment tool, Patient Health Questionnaire (PHQ-9), a self-administered or clinician administered assessment tool. This assessment measures severity levels of depression and provides pertinent information for developing the individual patient's PR care plan. Pre-and post-assessment using PHQ-9 is one component in evaluating patients and provides the PR team the feedback and follow-up needed to determine techniques for current and further development of the individual patient's rehabilitation process (Nici, Lareau, & Zuwallack, 2010).

Research Purpose

The purpose of this research study will be to evaluate the impact of pulmonary rehabilitation on depression scores in patients with COPD. In addition, this study will evaluate if there are differences in the depression scores between males and females following the program.

Theoretical Framework

Virginia Henderson (1897-1996) was influential in developing nursing theory in the twentieth century and pioneered the view of nursing as an independent occupation from medicine. Henderson's Nursing Need Theory was the theoretical framework used for this research study (McEwen & Wills, 2011, p. 126).

The Nursing Need Theory was developed by Henderson (1966) to define the unique focus of nursing practice. Her definition of nursing was:

The unique function of the nurse is to assist the individual, sick or well, in the performance of those activities contributing to health or recovery (or to peaceful death) that he would perform unaided if he had the necessary strength, will or knowledge, and to do this in such a way as to help him gain independence as rapidly as possible. (McEwen & Wills, 2011, p. 127)

The PR team can include some combination of doctors, nurses, physical therapists, occupational therapists, respiratory therapists, nutritionists, and exercise specialists with the main patient contact being the nurse. Henderson's nursing theory will be used for this study to show how the medical team in a pulmonary rehabilitation center helps support the patient to regain autonomy, decrease depressive episodes, and improve overall quality of life with exercise and work efficiency.

Research Question

This study will be conducted to determine: What is the effect of participation in a pulmonary rehabilitations (PR) program on depression scores in persons with COPD? Is there a difference between males and females in depression scores prior to and following participation in a pulmonary rehabilitation program?

Summary

COPD is a chronic and progressive disease commonly associated with varying degrees of breathlessness, cough, and excessive mucous production, leading to loss of functional capacity. Pulmonary rehabilitation aims to address not only the debilitating physiological symptoms, but also many of the psychological effects from living with COPD. Pulmonary rehabilitation is an effective and safe program that can produce significant and meaningful improvements in depressive occurrences as well as functional ability and quality of life (QOL) for men and women with COPD.

CHAPTER II

Literature Review

A literature review was conducted using a variety of databases: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Google, and PubMed. Keywords for the search included: COPD (chronic obstructive pulmonary disease), pulmonary rehabilitation, depression, and quality of life, men, women, and dyspnea and depression questionnaire test.

COPD

Background

Chronic obstructive pulmonary disease (COPD) is a chronic disease affecting the patient's daily life. The disease may also lead to depression, a disability, and/or handicap resulting in reduction in their overall quality of life. According to Centers for Disease Control (2015), COPD was the third leading cause of death in 2011. The CDC in 2015 reported 15 million Americans have been diagnosed with the disease.

Untreated and under-recognized depression and anxiety symptoms in patients with COPD have harmful effects on physical functioning and social interaction, increasing fatigue and healthcare utilization. Depression and anxiety are challenging to identify and treat because their symptoms often overlap with those of COPD. Identifying depression and anxiety then developing appropriate treatment strategies are critical to improving the quality of life of COPD patients and reducing their healthcare utilization (Yohannes & Alexopoulos, 2014).

Depression in COPD

Effects in Patients

Chronic obstructive pulmonary disease is a common lung disease that has a significant impact on the quality of life on patients diagnosed with the disease. Wilson (2006) explored the high occurrence of depression with COPD. Depression decreased the quality of life, negatively affecting the overall health of the patient. COPD patients attending a respiratory clinic presented less symptoms of depression than those patients served in a general practice. This outcome leans in the direction that depression is caused by COPD.

De (2010) cross-sectional study evaluated the frequency and severity of depression using the Hindi translation of PHQ-9 in patients with COPD. The questionnaire consists of nine items that are scored on a numeric scale. A total score can range from 0-27. Using the PHQ-9 self-administered questionnaire enabled respiratory physicians to diagnose, treat the disease, and make referrals. The study included 100 stable male patients with COPD with a mean age of 61.7 ± 9.6 years. Subjects with a previous diagnosis of depression or other chronic systemic disease, such as diabetes mellitus, coronary artery disease, renal or hepatic disease were disqualified from the study. The study showed that 72% of patients with severe COPD had depression. Screening for depression using the questionnaire could be less precise due to the many somatic symptoms associated with a COPD diagnosis. If a COPD patient is found to have high depression scores, further evaluation is warranted (De, 2010).

Iguchi et al. (2013) in-patient study was to evaluate depression of those with stable COPD using the Center for Epidemiologic Studies Depression scale (CES-D).

Iguchi et al. (2013) study identified how depression was related to lung function, body mass index (BMI), dyspnea, exercise capacity, BODE (body mass index, airflow obstruction, dyspnea, exercise capacity) stage, and health-related quality of life (QOL). The aim was to provide information helpful for the respiratory management of patients with COPD. There were 74 subjects consisting of 64 males and 10 females with COPD. Results of this study led to 54 subjects being admitted to a facility providing pulmonary rehabilitation and 20 patients with COPD admitted into a long-term care facility, beginning pulmonary rehabilitation upon reaching a stable state. Data on subjects was collected between November 2007 and November 2010. Criteria and diagnosis of COPD were determined using the Global Initiatives for Chronic Obstructive Lung Disease (GOLD) and stable physical status determined by the patients' physician. The average age was 72.7 years and 86% were male. Depression was found in 48.6%, affecting 36 of the 74 patients. The study demonstrated the prevalence of depression in COPD patients is greater compared to the healthy population, even those with conditions such as Parkinson disease. Many methods are used to identify the presence of depression. Iguchi et al (2013) used the CES-D due to its reliability and validity.

Comparison Men to Women

Di Marco et al. (2006) studied the frequency of anxiety and depression disorders in a large COPD population of male and female subjects. There was a wide range of disease severity. Of the 202 participants enrolled in the study, 155 were males with 47 females. Questionnaires were used to measure levels of anxiety, depression, dyspnea, and QOL (quality of life). The questionnaire used to evaluate depression in COPD patients was the Zung self-rated depression scale (SDS, Italian version). The questionnaire

consisted of 20 items with negative and positive contents to evaluate the depression level of the patient. Potential scores range from 20-80: the higher the score, the higher level of depression. The participants had to have a well-established diagnosis of COPD according to the American Thoracic Society criteria. All patients underwent physiological tests and arterial blood gas analysis. COPD patients are commonly affected by anxiety and depression whether the stage of the disease is mild, moderate, or severe. Di Marco et al. (2006) study also determined females had higher levels of anxiety and depression than men.

Han et al. (2007) conducted a study on how COPD had increased in women, as had hospitalization for COPD. The study found the number of women dying from COPD had exceeded men. This information raises the question of whether men and women are phenotypically different in susceptibility to tobacco smoke. Mortality rates in men with COPD have increased 13% and remained steady since 1985. For women, death rates related to COPD tripled between 1980 and 2000. In 2000 more women died of COPD than men. Once more, the death rates could be due to the rise of tobacco use in women. It has been noted that differences in disease impact, expression, and response to therapy between genders are evident in COPD.

Pulmonary Rehabilitation and Depression

Outcomes of Exercise Therapy

Von Leupoldt, Taube, Lehmann, Fritzsche, and Magnussen (2011) conducted a study with 238 participants who had COPD and were referred to an outpatient pulmonary rehabilitation program between January 1, 2008 and December 31, 2008. The study examined the impact of anxiety and depression on the COPD patients' daily life

activities. Interviews and a diagnostic classification were performed by a pulmonary physician according to the GOLD (Global Initiative for Chronic Obstructive Lung Disease) guidelines. The three-week program was intense and involved six hours/day for five days/week. The program included exercise (endurance training on a stationary cycle ergometer, treadmill, arm cycle ergometer, and strength training for upper, lower, trunk, and respiratory muscles), patient education, nutrition counseling, and psychosocial education. Both anxiety and depression were measured before and after the pulmonary rehabilitation program using the Hospital Anxiety and Depression Scale (HADS), a validated tool designed to detect clinically considerable anxiety and depression among medical patient groups including those with COPD. The population in the study consisted of 238 participants, with 57% men, 63% living with a mate, and 37% living alone. The study found the frequency of anxiety to be 41% while depression was 30%. Von Leupoldt et al. (2011) established that anxiety and depression are significantly connected with increased dyspnea and reduced functional performance and QOL (quality of life) in COPD patients. Von Leupoldt et al. (2011) also reported that detection of COPD at an early stage is of clinical importance in order to begin early treatment of the COPD patient.

Bentsen, Henriksen, Wahl, Wentzel-Larsen, and Rokne (2012) longitudinal design study evaluated changes and predictive factors of anxiety and depressive symptoms in COPD patients before and up to three months after pulmonary rehabilitation (PR). Of the 135 eligible patients with COPD, 100 (74%) consented to participate. Anxiety and depression were measured by the Hospital Anxiety and Depression Scale (HADS). HADS is a questionnaire that can be used to measure non-psychiatric patients

for anxiety and depression in hospital clinics. The questionnaire consists of 14 items. Seven items measured anxiety (HADS-A) and seven measured depression (HADS-D). Items were scored on a four-step scale ranging from 0 (not at all) to 3 (very much) (Patients with stable COPD demonstrated prevalence rates of 8-37% of anxiety and 16-88% of depression (Bentsen et al., 2012). Even though dyspnea is a key symptom, anxiety and depression are also common in COPD patients. Results of the study showed less anxiety and depression immediately after the program than immediately before though the changes were not significant.

Bhandari, Jain, Marolda, and ZuWallack (2013) conducted a retrospective study involving 366 participants with COPD. Data involving demographics, disease severity, outpatient, and hospital-based pulmonary rehabilitation was extracted from chart reviews. Institutional review board approval was obtained before the analysis of the study. Patient records were reviewed between December 2001 and December 2009. Patients attended 16, approximately three-hour sessions, twice weekly for the period of eight weeks. The study was to determine whether COPD patients' depression improved while participating in a pulmonary rehabilitation program. The Hospital Anxiety and Depression Scale (HADS) screened for depression symptoms. A score of ≥ 10 was considered abnormal, and a 1.5 units or greater in change was considered a threshold of a minimal clinically important difference (MCID). A six-minute walk was also included in the evaluation process along with the Chronic Respiratory Disease Questionnaire. Of the 366 participants, 257 (70%) completed the program, and post-rehabilitation outcome data was available on 235 (64%). COPD patients enrolled in the pulmonary rehabilitation program using HADS with scores greater than 10, had high prevalence of anxiety and depression

scores. At program entry, anxiety scores were 25% while depression scores were 17%. These scores dropped respectively (9% and 6%) in those patients completing the PR program. Bhandari et al. (2013) final results showed significant improvement of anxiety and depression scores in patients while participating and completing a pulmonary rehabilitation program. Since some patients had lower anxiety and depression scores before enrollment, there was no room for improvement.

Busch et al. (2014) conducted a retrospective chart review of 111 COPD patients' records enrolled in a community based outpatient PR program in Providence, RI. The Global Initiative for Chronic Lung Disease (GOLD) criteria was used to determine the severity of COPD in participants in this study. Patients were expected to attend the PR program for at least 20-36 sessions twice weekly. Patients who attended 20 or more sessions were considered "completers". Using a CES-D questionnaire, depression was measured in patients who participated in the PR program. A logistic regression model showed that lower depressed mood independently predicted PR completion across all patients (adjusted OR=.92, $p = .002$). For women lower depressed mood was an independent predictor for PR completion (Busch et al., 2014).

Da Costa et al. (2014), conducted a prospective study on the effects of how participating in a pulmonary rehabilitation program can improve quality of life, depression and anxiety in COPD patients. Da Costa et al. 2014 also reported variations in pulmonary function, dyspnea, and peripheral muscular dysfunction were apparent in patients with chronic obstructive pulmonary disease (COPD). These changes affect the patients' physical condition including: intolerance to exercise and progressive worsening of physical conditioning, even limiting their daily activities. The patient's physical

changes can also lead to social isolation, depression, anxiety and dependence. Between 27% and 79% of COPD patients had presented with depressive symptoms, decline in quality of life, extended hospital stays, recurrent hospital admissions and higher mortality rates. This study involved 147 patients, with 125 (85%) with a diagnosis of COPD completing the PRP in the period between May 2007 and December 2011. All patients diagnosed with COPD were evaluated by GOLD standard (Global Initiative for Chronic Obstructive Lung Disease). The 12-week pulmonary program included sessions lasting two hours divided into variety of exercises sessions and lectures for educational purposes. Of the 125 participants, 61.6% were male and 38.4% female, with a mean age of 63.89 ± 8.88 . After completion of the study, analysis of depression symptoms indicated scores of 12.60 ± 7.99 before and 8.96 ± 7.29 after participating in a pulmonary rehabilitation program. The data indicated that participating in a PR program can decrease depressive symptoms in COPD patients.

Nilesh, Aarti, and Ayub (2013) conducted a study consisting of 60 patients with a prior diagnosis of COPD. There were 43 males and remaining female. Of the 60 patients, 53 had a history of smoking, but during rehabilitation no patients were actively smoking. The Pulmonary Rehabilitation program met three times weekly, 45 minutes to one hour for four weeks in an outpatient setting. Patients' exercises included walking on the treadmill, cycling, and stepping up and down. Strength training for the different muscle groups was part of the program to help patients with balance and increased strength. Patients were supervised for breathing techniques including relaxed diaphragmatic and pursed lip breathing exercises. With pursed lip exercises, the COPD patients are able to control their breathing, decrease stress, and remain calm. Nilesh et al. (2013) overall

study showed COPD patients have psychosocial improvement, which helped patients understand their disease and lessen anxiety and depression. With evidence from the study of a PR program, it would be beneficial to a COPD patient to participate in a program as part of their medical management plan.

Patient Education and COPD

According to the American Thoracic Society (ATS, 2013) evidence-based information is available to patients who are interested in attending a pulmonary rehabilitation. Participants can learn about breathing techniques, medications, diet, relaxation, oxygen, travel, how to do everyday tasks with less shortness of breath, and how to stay healthy to avoid COPD exacerbations. Participants also learn to cope with changes related to COPD including but not limited to: depression, panic, anxiety, and others. An additional benefit of PR is the opportunity to meet individuals with COPD who have many of the same experiences and concerns. Patients can learn to be in control of their breathing instead of their breathing being in charge of them. Most programs meet two to three times a week and last four to twelve weeks. Various disciplines encompass the PR team which can include a combination of doctors, nurses, physical therapists, occupational therapists, respiratory therapists, nutritionists, and exercise specialists. To receive a personalized program addressing their specific needs and concerns, each patient will be evaluated with a pre- and post-assessment regarding depression and their quality of life prior to participation in a pulmonary rehabilitation program.

Summary

COPD has a significant impact on a patient's quality of life including depression and anxiety. A component in addressing improvement in the quality of life relating to

depression and anxiety is a Pulmonary Rehabilitation program. The literature provided strong evidence of success with those participating in a PR program as well as alleviating symptoms such as anxiety and depression associated with COPD. The literature will also support how depression scores differ between men and women prior and after completing a 12 week PR program.

CHAPTER III

Methodology

According to Legato (2010), 2007 to 2009, 7.4 million women developed COPD compared to 4.4 million men. Women in the general population experience higher rates of depression than men after a diagnosis of COPD (Busch et al., 2014). Decreased dyspnea, increased exercise tolerance, and improved health-related quality of life are benefits associated with participating in a pulmonary rehabilitation program (Lacasse, Goldstein, Lasserson, & Martin, 2006). The purpose of this study is to determine the effect of participation in a pulmonary rehabilitation (PR) program on depression scores in persons with COPD and if there is a difference between males and females in depression scores prior to and following participation in a pulmonary rehabilitation program.

Study Design

The study will utilize a descriptive design with a retrospective chart review. The quantitative descriptive design will identify variables and examine the differences in males and females with COPD using pre- and post-depression scores prior to and following participation in a pulmonary rehabilitation program. The retrospective chart review will use existing data that consist of patients diagnosed with COPD who have successfully completed the pulmonary rehabilitation program, gender and the PHQ-9 questionnaire that represent the pre- and post-depression scores completed by the patient. The co-investigator will review charts and extract data pertinent to the study. This study can provide valuable research opportunities, quality assessment, referrals to the cardiac/rehabilitation center by physicians and feedback to physicians on patient outcome

following completion of a pulmonary rehabilitation program. The study will provide evidence on how depression scores differ between males and females prior to and following completion of a pulmonary rehabilitation program.

Setting

The research study will be conducted at a regional healthcare system. The cardiac/pulmonary rehabilitation center is part of the teaching and research hospital in a county serving a population of 297,302 (Demographics & Data, 2015). The regional hospital includes 500+ physicians, specialists, sub-specialists and 5,600+ dedicated employees. The pulmonary rehabilitation program consists of 12 weeks of one-hour sessions two times a week. The program is intended to raise participants' awareness regarding disease management strategies; most notably for those who had reported feelings of anxiety and depression associated with COPD. The exercise portion of the program is designed to strengthen respiratory muscles, muscles of the arms, trunk, and legs. Another component of the pulmonary rehabilitation program are educational classes to discuss and review body mechanics, proper lifting, and energy conservation, medications, breathing training, infection control, and osteoporosis. It is anticipated the participants in pulmonary rehabilitation will experience increased strength, independence, and the ability to exercise to enhance emotional well-being while providing social, psychological, and occupational support. This study will determine if participating in a pulmonary rehabilitation program will have an overall influence on depression scores in patients and if pre- and post-depression scores differ between males and females.

Sample and Data Collection

This study will be a retrospective, non-experimental study where the co-investigator will extract existing data through chart reviews. Sampling will include gender, COPD patients' pre- and post-depression scores from the PHQ-9 questionnaire with start and end dates of when subjects participated and completed the pulmonary program. The co-investigator will de-identify the extracted data and enter into an Excel spreadsheet. Once compiled, the final results of the study will provide data on how depression scores are affected overall and determine any differences between males and females diagnosed with COPD prior to and following participation in a pulmonary rehabilitation program.

The researcher will obtain permission from the Director of Pulmonary Rehabilitation to review charts. Patients who have been diagnosed with COPD, completed the pulmonary rehabilitation program, and provided pre-and post-depression scores from the PHQ-9 questionnaire will be chosen for the convenience sample. Following a preliminary search of subject's charts, it was determined only 140 charts between December 1, 2011 and August 30, 2015 contained the predetermined criteria. After August 2015, the co-investigator was unable to locate data on other chart reviews meeting the inclusion criteria. Of the 140 charts preselected from the chart review, only 37 files met the full study inclusion criteria with remaining 103 charts excluded from the study. The inclusion criteria included: gender, pre-and post-depression scores determined by the Patient Health Questionnaire (PHQ-9, a multipurpose instrument for screening, diagnosing, monitoring and measuring severity of depression), along with start and end dates of the pulmonary rehabilitation program for each subject. The co-investigator

employed by the regional hospital system and team leader of the pulmonary rehabilitation program with first-hand knowledge of the participants, will gather all related data associated with the study. An Excel spreadsheet will be developed by the co-investigator with the accumulated de-identified information that consist of gender, pre- and post-depression scores from the PHQ-9 questionnaire along with start and end dates of the subject's participation in the program. The completed Excel spreadsheet will be forwarded to the researcher for review prior to a meeting with the statistician who will analyze and interpret the information.

Protection of Human Subjects

There is minimal risk to the participants during this chart review. Permission from the director of Cardiac Pulmonary Rehabilitation Center and Institutional Review Board (IRB) approval will be obtained before collecting existing data. All data will be protected under the Health Insurances Portability and Accountability Act (HIPAA). During the study, each subject will be assigned a number to protect the patient's privacy. Information obtained will not be shared with non-study personnel. The data will also be entered into a password-protected computer with the data being protected on a secure server. The spreadsheet containing the de-identified data will be given to the University IRB committee for information and review. At the close of the study, all data will be retained for three years then destroyed as required by the University.

Data Analysis

The de-identified data extracted from the chart review on each patient diagnosed with COPD and who have completed the PR program will be entered into an Excel spreadsheet. The spreadsheet will be imported into JMP Pro 12.2 for statistical analysis.

A paired-samples t-test will be conducted to determine the impact of the patient's participation in pulmonary rehabilitation by comparing pre-and post-depression scores with focus on differences in scores between males and females.

CHAPTER IV

Results

Pulmonary rehabilitation has been shown to produce short-term benefits including reduced dyspnea, increased exercise tolerance, and improved health-related quality of life in patients with COPD; the benefits of which have been primarily attributed to the exercise component of rehabilitation (Lacasse et al., 2006). In the general population, females experience higher rates of depression than males following a diagnosis of COPD (Busch et al., 2014). The purpose of this study was to determine the effects on depression scores after participating in a pulmonary rehabilitation program and if depression scores in males and females with COPD differ before and after participating in a pulmonary rehabilitation program.

Sample Characteristics

A retrospective chart review of 140 charts from December 1, 2011 to August 30, 2015 produced a sample consisting of 37 participants. The study involved male and female participants diagnosed with COPD who completed a pulmonary rehabilitation program. Of the 140 charts, 103 were excluded due to patients not meeting the inclusion criteria. The inclusion criteria consisted of pre-and post- depression scores from the PHQ-9 questionnaire, enrollment and completion date of program participation, and gender. According to the co-investigator, the cardiac/pulmonary rehabilitation center does not record why participants do not complete the pulmonary rehabilitation program. In order to obtain valid results, only the 37 participants who completed the program and filled out the PHQ-9 questionnaire before and after completion of the pulmonary

rehabilitation program were included in the study. The 37 participants consisted of 17 (46.0%) females and 20 (54.1%) males.

Major Findings

The PHQ-9 questionnaire is a multipurpose instrument for screening, diagnosing, monitoring, and measuring the severity of depression. Levels of severity to measure depression scores are: 0-4 none, 5-9 mild, 10-14 moderate, 15-19 moderately severe, 20-27 severe. Figure 1 represents the 17 female's pre- and post-depression scores noted for each participant. Results show 15 (88.2%) participants improved depression scores, one (5.9%) had no improvement and one (5.9%) had a slight increase in depression score. Therefore, 15 (88.2%) of the 17 female participants had improved depression scores after completing the pulmonary rehabilitation program. Figure 2 represents the 20 male's pre- and post-depression scores. Results show 12 (60.0%) participants improved depression scores, three (15.0%) had no improvement and five (25.0%) had an increase in depression scores. Therefore, 12 (60.0%) of the 20 male participants had improved depression scores after completing the pulmonary rehabilitation program. The study revealed both females and males had improvement in depression scores. Females had a higher rate of improvement at 88.2% and males at 60.0% post pulmonary rehabilitation participation. The figures below show nine (53%) females and five (25%) males with pre- depression scores greater than or equal to 10. This indicates females began at a higher level of depression than males. The post-depression scores noted on the graphs show six females (35%) moved out of the moderate to severe level of depression and three (17.6%) remained in the moderate to severe level. Of the males, four (20%) moved out of the moderate to severe, while pre (5%) remained in the moderate to severe level. Participants

with depression scores 10 or greater would need further evaluation from the clinical staff to discuss treatment options for participant's depression. Depression scores nine or below would not warrant further clinical evaluation unless other symptoms are present. The reasons males and females differ in depression are not clear, but thought to be biological, psychological, and partly sociocultural. Compared to men, women may have a stronger genetic predisposition to develop depression and are more likely to seek out a diagnosis of depression as well as discuss their feelings with their physician (Weissman, 2014).

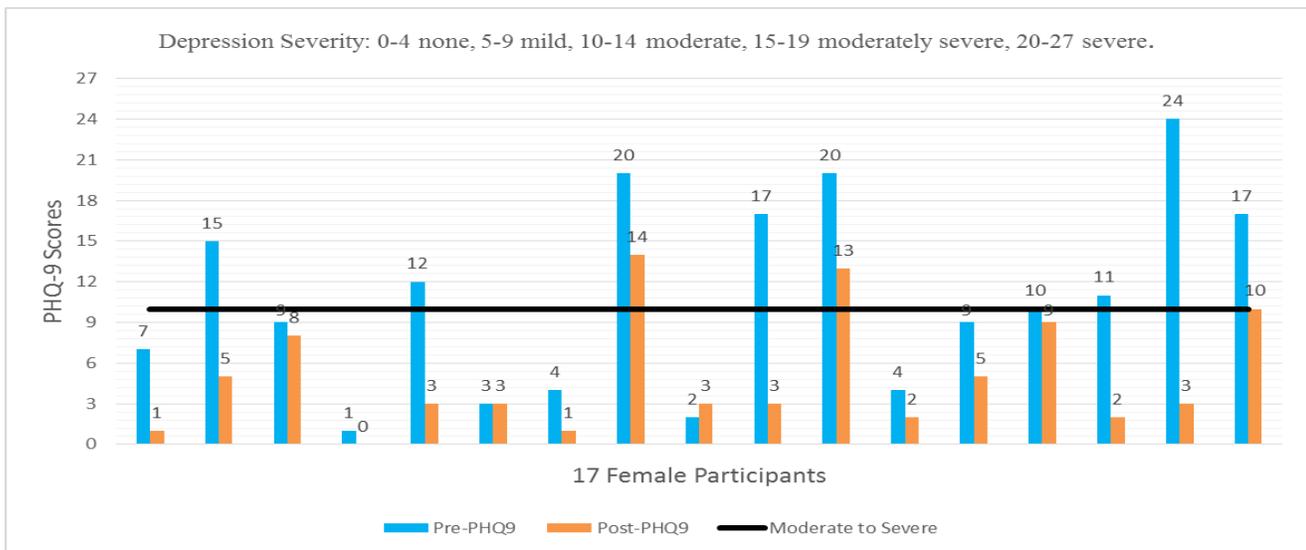


Figure 1. Female Depression Severity

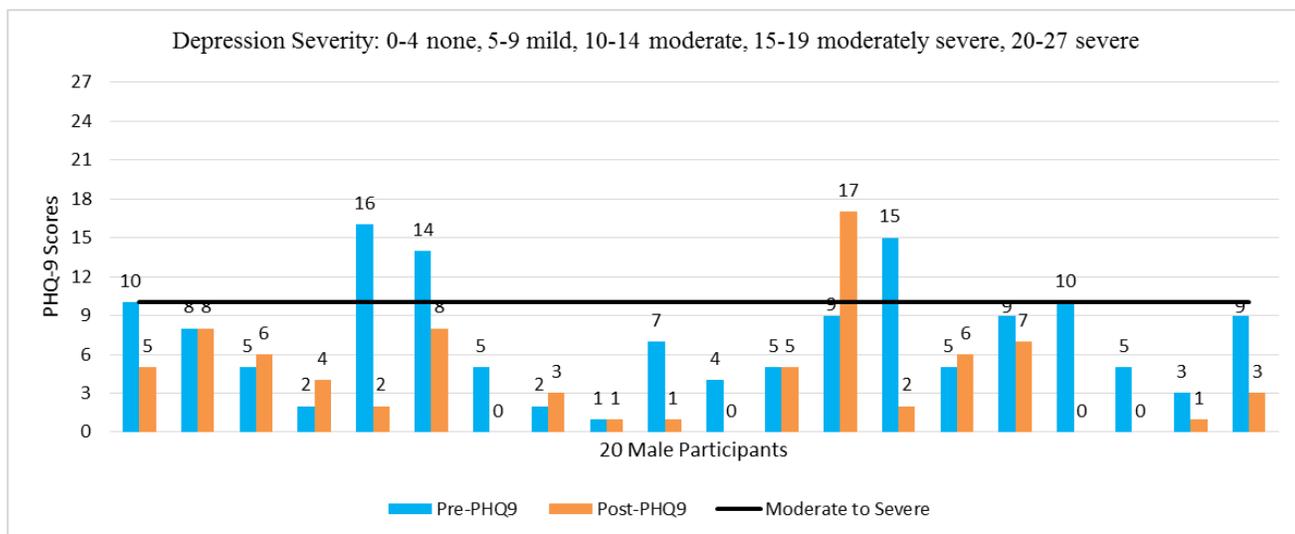


Figure 2. Male Depression Severity

The PHQ-9 questionnaire was completed by the 37 participants prior to and following completion of the pulmonary rehabilitation program. A paired t-test was run to compare the depression scores as shown in Table 1. Data in the table illustrates evidence of improvement in depression scores (mean difference μ -4.5) in all patients. Results show more of an improvement in post PHQ-9 in females (-5.9) than in males (-3.25) after completing the program. There was a statistically significant difference ($t=4.9$, $p<.0001$, $CI=95\%$) in the scores for the pre -PHQ-9 ($\mu =8.9$, $SD= 4.15$) and post-PHQ-9 ($\mu =4.4$, $SD=5.93$) assessments. Mean improvement in PHQ-9 scores was -4.5 (males= -3.3, females -5.9).

Table 1

Mean Depression Scores Analysis

Analysis paired t-test	All Patients	Standard Deviation	Females	Males
Pre-PHQ-9 Mean	8.9	4.15	10.9	7.2
Post-PHQ-9 Mean	4.4	5.93	5	3.95
Mean difference (μ)	-4.5	5.6	-5.9	-3.25

Summary

This study has provided evidence that participating in a pulmonary rehabilitation program can affect participants' overall depression scores and identifies how males and females differ in their depression scores. Statistically 72% of the participants showed an overall improvement in depression scores, however, only 38% of the participants had clinical application. Because females had a higher level of depression before participating in the pulmonary rehabilitation program, they showed more of a decrease than males. This study can provide valuable research opportunities, quality assessment, and feedback to provider on patient outcome following completion of a pulmonary rehabilitation program

CHAPTER V

Discussion

Implications of Findings

The purpose of this study was to determine if a pulmonary rehabilitation program affected depression scores of patients diagnosed with COPD and if males and females differ in their depression scores before and after completing a program. Data collected from a PHQ-9 questionnaire before and after completing a pulmonary rehabilitation program was used to survey depression scores in males and females. The statistical data collected from the questionnaire showed females in the mild to severe level had a significant decrease in depression scores. These results could be attributed to females having a higher level of depression than males before participating in the program. Although the sample size was small, data collected for males and females in the moderate to severe level showed no significant difference statistically in depression scores after participating in a pulmonary rehabilitation program. With these findings, nurses will be better educated to evaluate participant's level of depression and help personalize an individual plan of care.

Application to Theoretical Framework

The nursing need theory was developed by Henderson (1966) to define the focus of the nursing practice. Her definition of nursing was:

The unique function of the nurse is to assist the individual, sick or well, in the performance of those activities contributing to health or recovery (or to peaceful death) that he would perform unaided if he had the necessary strength, will or knowledge, and to

do this in such a way as to help him gain independence as rapidly as possible. (McEwen & Wills, 2011, p. 127)

Henderson's Nursing Need Theory was the framework utilized for this research study. The theory explores how to assist the sick or well patient to gain independence as quickly as possible. The model was utilized to show how the medical team in a pulmonary rehabilitation center helps support the patient to regain autonomy, decrease depressive episodes and improve overall quality of life.

Based on Henderson's nursing theory, patient education is a critical element in moving patients toward independent, self-management of COPD and is the objective of Henderson's nursing framework (Carlson, Ivnik, Dierkhising, O'Byrne, & Vickers, 2006). A nurse's job is to care for patients and educate them on how to care for themselves both mentally and physically once they leave the healthcare facility. Pulmonary rehabilitation nurses assist COPD patients in assessing and managing their depression by use of the data collected from a PHQ-9 questionnaire and monitoring progress to determine method of treatment and who may be more likely to need further aid and assistance.

The review of genders provides additional information to the healthcare providers on who to monitor more closely due to their predisposition towards depression as determined in the study.

Limitations

The retrospective chart review of 140 charts produced a sample consisting of 37 participants diagnosed with COPD who met the inclusion criteria to be considered for the study. The results of the study were limited due to the small sample size of the

participants. Of the 37 participants, 23 had depression scores nine or below and would not warrant further clinical evaluation unless other symptoms were present.

Implications for Nursing

Research has shown participating in a pulmonary rehabilitation program leads to improved health, quality of life, improved exercise, and educating patients to understand COPD modifications in daily living (Booker, 2005). One of the most important aspects of the nurse's role in pulmonary rehabilitation is to help patients understand the link between a healthy, more active lifestyle and an increase in their ability to manage on a day-to-day basis. COPD can mask symptoms associated with depression. Nurses and health care professionals who work with COPD patients in a pulmonary rehabilitation program need to receive additional education and training to recognize early signs and symptoms of depression. Early intervention can lead to a better outcome for the patient.

Recommendations

Recommendations for further research would include conducting research at a variety of sites to increase sample size. Increasing the sample size could provide supporting data on depression scores and how they differ between males and females. It would be beneficial to educate healthcare providers and patients on how participating in a pulmonary rehabilitation program has positive effects on both physical and mental health.

Conclusion

The data from the research indicated participation in a pulmonary rehabilitation program improved depression scores. Pre- and post-depression scores in males and females with moderate to severe depression showed no significant gender difference. Even though, the statistical data in this study showed little difference in depression scores

between males and females, the clinical outcome revealed that depression scores can be reduced by participating in a pulmonary rehabilitation. The sample was small and further research could provide additional evidence regarding differences in depression scores for males and females before and after completing a pulmonary rehabilitation program.

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