8-8-2023

Perceptions of Healthcare Students toward Pulmonary Rehabilitation Programs for COPD Patients

Amani Assiry

Recommended Citation

Assiry, Amani, "Perceptions of Healthcare Students toward Pulmonary Rehabilitation Programs for COPD Patients." Thesis, Georgia State University, 2023.
doi: https://doi.org/10.57709/35828013

PERCEPTIONS OF HEALTHCARE STUDENTS TOWARD PULMONARY REHABILITATION PROGRAMS FOR COPD PATIENTS

By

Amani Assiry

A Thesis

Presented in Partial Fulfillment of Requirements

for the Degree of Master of Science in

Health Sciences

The Department of Respiratory Therapy

Under the supervision of Dr. Douglas S. Gardenhire

in

The Byrdine F. Lewis College of Nursing and Health Professions

Georgia State University

Atlanta, Georgia

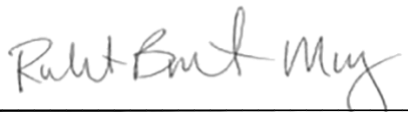
2023

ACCEPTANCE

This thesis, Perceptions of Healthcare Students toward Pulmonary Rehabilitation Programs for COPD Patients, by Amani Assiry was prepared under the direction of the Master's Thesis Advisory Committee of the Respiratory Therapy department at Georgia State University. It is accepted by the committee in partial fulfillment of requirements for the Master of Science degree in Respiratory Therapy at Byrdine F. Lewis College of Nursing and Health Professions, Georgia State University.

The Master's Thesis Advisory Committee, as representatives of the faculty, certifies that this thesis has met all standards of excellence and scholarship as determined by the faculty.

_____ Date: 7/12/2023_____
Douglas S. Gardenhire, Ed.D, RRT, RRT-NPS, FAARC
Committee Chair



_____ Date: 7/12/2023_____
Robert B. Murray, MS, RRT
Committee Member

_____ Date: 7/12/2023_____
Kyle Brandenberg, PhD, RRT
Committee Member

AUTHOR'S STATEMENT

In presenting this thesis as a partial fulfillment of the requirements for the advanced degree from Georgia State University, I agree that the library of Georgia State University shall make it available for inspection and circulation in accordance with its regulations governing materials of this type. I agree that permission to quote, to copy from, or to publish this thesis may be granted by the professor under whose direction it was written, by the Byrdine F. Lewis College of Nursing and Health Professions director of graduate studies and research, or by me. Such quoting, copying, or publishing must be solely for scholarly purposes and will not involve potential financial gain. It is understood that any copying from or publication of this thesis which involves potential financial gain will not be allowed without my written permission.

Amani Assiry

_____

Signature of Author

NOTICE TO BORROWERS

All these deposited in the Georgia State University Library must be used in accordance with stipulations prescribed by the author in the preceding statement.

The author of this thesis is:

Amani Assiry

83 Ernest Barrett Pkwy

Marietta, GA 30066

The director of this thesis is:

Douglas S. Gardenhire, Ed.D, RRT-NPS, FAARC

Governor's Teaching Fellow

Chair and Clinical Associate Professor

Byrdine F. Lewis College of Nursing and Health Professions

Department of Respiratory Therapy

Georgia State University P.O.

Box 4019

Atlanta, GA 30302-4019

Users of this thesis not regularly enrolled as students at Georgia State University are required to attest acceptance of the preceding stipulation by signing below. Libraries borrowing this thesis for use of their patrons are required to see that each user records here the information requested:

NAME OF USER ADDRESS DATE TYPE OF USE

(EXAMINATION ONLY OR COPYING)

DEDICATION

This thesis work is dedicated to my husband, who sacrificed his time to be beside me to achieve my goal. I am truly thankful to have him by my side. His tremendous support and encouragement helped me accomplish one of my greatest accomplishments. To my beloved daughter, Sara, I love you so much, you have been my greatest source of inspiration. Your love and belief in me have made me a stronger person.

To my lovely mother, who has always loved me unconditionally, thank you for encouraging me to work hard for the things that I aspire to achieve, and I cannot thank you enough for all you have done for me. I also would like to extend my gratitude to my siblings for their unlimited love, support, and encouragement. Your presence in my life has been a constant source of strength and motivation. For all my best friends, thank you for standing by me during the challenging times.

To all those mentioned above and everyone who has been part of my journey, I offer my heartfelt thanks for your presence and support…

With sincerest appreciation,

Amani Assiry

ACKNOWLEDGMENTS

I would like to express my deepest appreciation to Dr. Douglas Gardenhire for his support, motivation, and guidance. My completion of this thesis could not have been accomplished without his backing and direction. It was my honor to work under his supervision. I would also like to extend my deepest gratitude to Prof. Robert Murray and Dr. Kyle Brandenberger for their valuable and continuous advice and assistance throughout this study.

Amani Assiry

Summer, 2023

Perceptions of Healthcare Students toward Pulmonary Rehabilitation Programs for COPD Patients

By

Amani Assiry

(Under the Direction of Douglas S Gardenhire)

ABSTRACT

Background: Pulmonary Rehabilitation (PR) program is an effective non-pharmacological intervention for patients with COPD. It aims to improve quality of life, exercise capacity, and lung function. PR has been shown to reduce mortality and morbidity rate. To enhance COPD management strategies, it is essential to examine students' perceptions toward PR programs to determine the need for the implementation of educational courses about the effectiveness of PR programs. This study would also be considered one of the initial steps in developing a pulmonary rehabilitation education course in the curriculum of all healthcare programs at Georgia State University. **Purpose:** was to assess the perceptions of various enrolled healthcare students at a large urban university. **Methods:** The data used for this study were collected from three different healthcare programs at GSU using a convenience sample. Data were collected through a self-administered survey consisting of 38 questions on a 5-point Likert- type scale evaluating the perceptions. The survey was examined for face validity by respiratory therapy educators from GSU. Data was analyzed using the statistical program of Statistical Package for the Social Sciences (SPSS). **Results:** A total of 178 participants from three programs. The majority of respondents were respiratory therapy students (43.3%); followed by physical therapy (39.9%); occupational therapy (16.9%). The study findings revealed there were differences in the perception of students regarding pulmonary rehabilitation. There was a significant difference in positive perceptions between students who had experience attending PR programs and those who did not ($p=0.043$). There were no differences found among students in familiarity with PR programs ($p=0.060$). Finally, there were no differences in the perception of students regarding the factors that could influence COPD patients' decisions not to participate in the PR programs. **Conclusion**: Healthcare students value and have a positive perception toward PR. The results of this study support the idea of the implantation of PR courses throughout the healthcare program curriculum. Healthcare students felt that they had an important role in PR programs, but barriers to participating and assisting in PR included their own lack of knowledge and clinical experience. They considered that there should be more teaching on pulmonary rehabilitation and that these should feature in both the curriculum and clinical. Further studies with a higher number of participants and different institutions are recommended.

Table of Contents

List of Tables

List of Figures

Chapter I

Introduction

Chronic obstructive pulmonary disease (COPD) is one of the most causes of mortality and morbidity around the world. COPD is a condition in which the airflow that carries air inside and outside your lung can be tight and narrow, leading to breathing difficulties. The main characteristic of this disease is strong productive coughing that builds up some mucus in your airflow. In general, COPD patients usually have some of these severe symptoms: shortness of breath, wheezing, chest tightness, and confusion. Unmanageable these symptoms become more severe and worse with time, known as an acute exacerbation of COPD (AECOPD). AECOPD is also associated with reduced exercise capacity and prevention of daily activities. In the United States, approximately 15.7 million Americans are diagnosed with COPD (Wheaton et al., 2015). In 2018, COPD ranked the fourth highest cause of death in the US (Xu et al., 2020).

What is a pulmonary rehabilitation program?

As described by the American Thoracic Society (ATS) and the European Respiratory Society (ERS) pulmonary rehabilitation is "an evidence-based, multidisciplinary, and comprehensive intervention for patients with chronic respiratory diseases who are symptomatic and often have decreased daily life activities" (Spruit et al., 2013). It includes exercise training, breathing techniques, patient education and counseling, smoking cessation, and psychological support. A successful PR program should be led by a multidisciplinary healthcare team of physicians, nurses, respiratory therapists, physical therapists, psychologists, occupational therapists, dietitians, and social workers (Gushken et al., 2021).

Pulmonary rehabilitation (PR) is the most efficient intervention for COPD patients (Rochester et al., 2015). Beginning in the 1990s, PR has been used to treat patients with COPD

(British Thoracic Society, 2013). Non-pharmacological treatment such as pulmonary rehabilitation is an effective intervention for patients with COPD and has the potential to reduce morbidity and mortality. Because of this, several studies have focused on its positive impact on reducing the mortality rate among COPD patients (Qassm et al., 2011). In addition, the management and early treatment of patients with COPD may reduce the incidence of exacerbations, improve lung function, and better quality of life (QOL) (Pitta et al., 2008).

Pulmonary rehabilitation may be an important factor in improving exercise capacity and dyspnea. Recent studies have proven the efficacy of pulmonary rehabilitation in patients suffering from exacerbations of COPD (Clini et al., 2010). As a result, PR should consider an effective strategy to manage AECOPD.

Based on recent guidelines, pulmonary rehabilitation should be included in the management plan for patients with severe symptoms and activity limitations (Spruit et al., 2013). Even with pharmacological intervention, PR has made it possible to improve the exercise capacity and the quality of life of patients with COPD (Schroff et al., 2016). Furthermore, recent studies recommend that PR should last at least eight weeks, with two to three sessions a week to benefit from the program (Warrington et al., 2014). Hence, understanding healthcare students' perceptions and awareness of PR efficiency among COPD patients will significantly increase the number of patients who could benefit from PR.

Statement of problem

All healthcare students work with critically ill patients who have breathing difficulties and activity limits. Also, these students have a positive effect on convincing physicians about the importance of the PR program for COPD patients, and this may lead to more referrals. However, there are not enough studies available that discuss how PR is necessary for patients with

breathing problems. And few studies focus on measuring the perceptions of HCS toward PR. As a result, assessing healthcare students' perceptions regarding PR programs for COPD patients is important for the implementation of educational sessions. Also, this study will evaluate and assess the need to provide teaching sessions on the effectiveness of PR in patients with COPD for HCS.

Purpose of the study

The aim of this descriptive study is to evaluate and assess healthcare students' perceptions toward pulmonary rehabilitation programs for COPD patients to provide helpful information about similar or different perceptions based on various factors such as degree programs and experience in PR.

Significance of the Study

This study evaluates the perceptions and awareness of healthcare students toward pulmonary rehabilitation programs for COPD patients. In addition, it is important to focus on the perceptions of the HCS about the effectiveness of PR, as it is identified as a key element in reducing the incidence of exacerbations, improving lung function, and improving the quality of life among COPD patients. This study also would be considered one of the initial steps in developing a pulmonary rehabilitation education course in the curriculum of all health programs at Georgia state university.

Study questions

For that reason, this study was conducted to answer the following research question:

What are healthcare students' perceptions toward pulmonary rehabilitation programs for COPD patients?

Are Respiratory therapy students more familiar with pulmonary rehabilitation programs than other healthcare students?

Do healthcare students with more experience attending pulmonary rehabilitation programs have more positive perceptions compared to students with less experience?

What do healthcare students think about the factors that could influence COPD patients' decision not to participate in the PR program?

Definition of Terms

HCS: Healthcare students

RTs: healthcare providers specialized in working therapeutically with people suffering from pulmonary disease.

COPD: Chronic Obstructive Pulmonary Disease

COPD: is a condition in which the airflow that carries air inside and outside your lung can be tight and narrow, leading to breathing difficulties

AECOPD: is an acute exacerbation of COPD

Pulmonary rehabilitation: is “an evidence-based, multidisciplinary, and comprehensive intervention for patients with chronic respiratory diseases who are symptomatic and often have decreased daily life activities” (Spruit et al., 2013).

Delimitations

This study included a population of healthcare students at Georgia State University. The findings of this study can only be generalized to this group of students. To prevent errors, it excludes non-healthcare students. Data from the students will be utilized to satisfy the research questions.

Limitations

The study may have the following limitations:

1. One of the limitations is the small sample size due to the short duration of this study.
2. Healthcare students used in the study are from different specialties.
3. Students used in the study are at different program levels and may have different experiences.

Assumptions

perceptions about any disease play a critical role in identifying effective treatment strategies. Given that respiratory therapy students are important to the healthcare team, RTs should have a high level of knowledge about recent updates on pulmonary rehabilitation in patients with COPD. Also, this study would be considered one of the initial steps in developing a pulmonary rehabilitation education course in the curriculum of all health programs at Georgia state university. The participants in this research are supposed to answer the questions as honestly and freely as feasible.

Summary

The pulmonary Rehabilitation program is an effective non-pharmacological intervention in patients with COPD. It aims to increase the quality of life, exercise capacity, and lung function among COPD patients. As well, PR has been shown to reduce mortality and morbidity. Therefore, perceptions of HCS and awareness of the effectiveness of PR are needed to influence physicians to increase the number of patients referred to PR programs in the future. Consequently, the purpose of this study is to measure and assess students' perceptions of pulmonary rehabilitation programs for COPD patients to determine the need for educational sessions for HCS.

Chapter II

Review of Literature

Introduction

A literature review provides the most up-to-date information on a specific topic and allows the researcher to discover what other studies have done. This literature review aims to illustrate others' perceptions of pulmonary rehabilitation in COPD patients. Clarifying the topic from various perspectives leads to identifying the missing evidence to prove the need for this study. The literature was gathered from the following databases: PubMed, Science Direct, Google Scholar, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and the Global Initiative for Chronic Obstructive Lung Disease (GOLD). The words that have been entered into the databases are chronic obstructive pulmonary disease, (COPD), morbidity, and mortality. Moreover, pulmonary rehabilitation, quality of life, pulmonary rehabilitation for COPD patients, perceptions, and referring COPD patients.

The results of the research revealed a variety of publications that examined physician awareness and perceptions of pulmonary rehabilitation among patients with COPD. However, studies in assessing healthcare students' perceptions of pulmonary rehabilitation for COPD are insufficient.

Chronic Obstructive Pulmonary Disease (COPD)

Chronic Obstructive Pulmonary Disease (COPD) is a preventable and treatable disease that is characterized by chronic inflammation and obstructed airflow. Both emphysema and chronic bronchitis are the most common causes of COPD. Chronic bronchitis is a long-term disease that causes inflammation and irritation of the bronchial wall, which moves the air in and out of the alveoli of the lungs. It provokes a strong, productive cough that causes the

accumulation of mucus (sputum) in the airways. Moreover, chronic bronchitis usually results from exposure to irritants that adversely affect the bronchial. There are many reasons for chronic bronchitis, such as cigarette smoke, tobacco smoke, air pollution, and occupational dust. Emphysema is a disease where the alveoli and bronchioles are damaged and destroyed, leading to airway obstruction and difficulty breathing. COPD patients may suffer from these symptoms: shortness of breath, wheezing, weight loss, strong-productive cough, chest tightness, and a reduction in exercise tolerance. In addition, some COPD patients may suffer from COPD exacerbations, where these symptoms become severe and worse than usual. Overall, the spirometry test is the best way to diagnose COPD. This test measures how much air the patient can get into and out of the lung.

Increasing morbidity rates can be associated with increasing the age of COPD patients (Halbert et al. 2006). In addition, increased morbidity may occur when COPD disease is combined with other diseases, such as cardiovascular disease, musculoskeletal impairment, and diabetes mellitus (Chen et al. 2015). According to Polatli et al. (2012), COPD patients spent an average of 6.3 nights at the health clinic and 3.9 emergency visits within six months, which can cause a major economic impact.

There is no doubt that COPD is a leading cause of death in most countries. Moreover, COPD has become the third most common cause of death in the United States (Hoyert et al. 2011). According to the Centers for Disease Control and Prevention (CDC) (2022), the prevalence of COPD is higher in females compared to males. As well, there was a reduction in the mortality rate among adults aged ≥ 45 years between 1999 and 2019.

Effective intervention in patients with COPD has the potential to significantly improve health outcomes. In addition, COPD requires a successful management plan that controls the

symptoms, limits the disease progression, improves the quality of life (QOL), and reduces the risk factors. While there is currently no cure for COPD, applying a combination of pharmacological and non-pharmacologic treatments can decrease the frequency of exacerbation and mortality rate among COPD patients. As a non-pharmacological intervention, pulmonary rehabilitation is essential to the COPD management plan (Spruit et al. 2013). Overall, there are noteworthy benefits to the health of COPD patients from PR.

Pulmonary Rehabilitation programs (PR)

Pulmonary rehabilitation (PR) is a comprehensive multidisciplinary intervention that provides exercise training, education to patients, and behavior change to improve the physical and psychological status of people with chronic respiratory disease. And promote long-term dedication to healthy behaviors (Spruit et al. 2013). The healthcare team in PR varies around the world and should include, but not be limited to, physicians, nurses, respiratory therapists, physiotherapists, psychologists, occupational therapists, dietitians, and social workers (Vogelmeier et al. 2017). The assessment of patients before enrollment in a PR program should be done clearly and comprehensively with consideration of many factors such as healthcare needs, nutritional health, psychological status, exercise tolerance, smoking history, and dyspnea score on the dyspnea scale (Garvey ET AL, 2013).

According to the GOLD (2022), supervised training should be provided at least twice a week. This can include any educational program, interval training, and resistance training. Additionally, walking exercise, flexibility, and inspiratory strength training. The effectiveness of patient education alone has not been proven (GOLD, 2022). In addition, elderly people or COPD patients are expected to do at least 150-300 minutes of moderate-intensity physical activity or 75-150 minutes of vigorous-intensity aerobic physical activity per week, and other muscle-

strengthening activities at least two days a week (WHO, 2020). As well, Warrington et al. (2014) recommended that patients with COPD should receive at least 8 weeks of rehabilitation with 2-3 sessions per week. In brief, current studies recommend considering pulmonary rehabilitation in patients with persistent symptoms and activity limitations, and for those who are unable to cope with their illness despite optimal medical treatment (Spruit et al. 2013).

Pulmonary Rehabilitation for COPD Patients

Pulmonary rehabilitation has been shown to significantly improve dyspnea, exercise tolerance, psychological symptoms, and quality of life in COPD patients (McCarthy et al. 2015). In addition, the annual cost of non-pharmacological therapy is significantly lower than the annual cost of pharmacological therapy. Recent studies have shown that pulmonary rehabilitation is beneficial to patients with COPD regardless of their baseline level of lung function (Garrod et al. 2006). Moreover, the British Thoracic Society Guideline summarized the positive impact of pulmonary rehabilitation for COPD patients as three main aspects: improving exercise capacity, improving dyspnea, and improving psychological well-being (Bolton et al., 2013). For this reason, several studies have focused on pulmonary rehabilitation in patients with COPD and its effectiveness.

Mei He et al. (2015) assessed the effectiveness and safety of PR after the exacerbation of COPD patients. This randomized controlled study involved 94 inpatients admitted due to the acute exacerbation of COPD (AECOPD). These participants were divided into two groups. The control group received routine care, and they were aged 28. The PR group received pulmonary rehabilitation, and they were 66. The authors found that in the PR group, 6-minute walk distance (6MWD), resting SpO2, and exercise Borg dyspnea scores had improved significantly. In addition, considerable improvements have also been observed in the Daily Living Dyspnea scale

(ADL-D), and Chronic Respiratory Questionnaire-Self Administered Standardized Score (CRQ-SAS) among the PR group compared to the control group. As a result, this study provides evidence that early PR implementation for hospitalized patients with AECOPD is safe and effective, and clinicians should promote PR after AECOPD, regardless of the severity of AECOPD.

Ryrsoo et al. (2018) performed a systematic review and meta-analysis to evaluate the effect of a supervised early PR program, started during or within 4 weeks after hospitalization with an acute exacerbation of COPD (AECOPD), compared with usual care on mortality rate, the number of days in the hospital, and readmission. This study included 13 randomized-controlled trials and a total of 634 participants who were in the recovery phase of an AECOPD. 322 patients received early PR, and 312 received usual care. The meta-analysis of this review showed a reduction in the mortality rate of 42% in patients receiving early PR compared to usual care. Not only was the mortality rate reduced, but the number of days spent in the hospital was reduced by 4.27 days. In addition, early PR can cause a decrease in hospital readmissions over usual care among AECOPD patients. As a result, the author recommends early supervised PR for patients with AECOPD, and PR should be initiated upon admission to the hospital or within 4 weeks of discharge.

Recent studies have validated the effectiveness of pulmonary rehabilitation (PR) in patients with COPD in improving exercise tolerance, symptoms, lung function, and quality of life. However, researchers are anxious that the benefits of pulmonary rehabilitation (PR) diminish over time in COPD patients. Experts suggest that all patients who complete the PR program be encouraged to continue to exercise beyond the end of the PR program (Ries et al. 2007). Some studies have shown that the positive outcomes of PR programs last no longer than

one year with a maintenance technique (Brooks et al. 2002). Others show that maintenance techniques extend the outcomes of PR a little longer, either by using simple techniques (Strijbos et al. 1996), implementing PR maintenance programs in the community (Moullec et al. 2008) or implementing them in the home (Wijkstra et al. 1995).

Therefore, in 2016, Guell and his colleagues conducted a three-year multicenter prospective randomized trial of a well-supervised maintenance program compared to usual care after completing an intensive PR program among moderate-to-severe COPD patients. The study's goal was to see if a long-term maintenance program three years after completing the intensive PR program would maintain the PR program's positive outcomes in COPD patients. 143 patients with moderate-severe COPD were enrolled in an initial 8-week outpatient PR program in a hospital setting. Once the program was completed, patients were assigned randomly to one of these two strategies: the maintenance intervention group (IG) and the control group (CG). The BODE index, 6-minute-walk test distance (6MWD), and health-related quality of life were measured and compared at 12, 24, and 36 months. The results indicated that 96.5% completed the eight-week PR program sessions. 34 patients were in the IG group and 39 were in the CG group. Based on the results got during the intensive PR program, there have been significant improvements in the BODE index, 6MWD, and quality of life among both groups. On the other hand, in the first two years of monitoring, the IG group maintained the improvements achieved compared with the CG group. At three years, the compliance rate for the IG group was 66% and 17% for the GC group. The authors conclude that, for patients with moderate-severe COPD, a weekly maintenance PR program is effective at extending the benefits of the BODE index, 6MWD, and health status for up to two years.

Barriers to referring COPD patients for pulmonary rehabilitation

Despite the benefits of pulmonary rehabilitation among COPD patients, referral to PR seems low, as it is estimated that only 3% to 16% of eligible patients were referred (Azarisman et al. 2008). A cross-sectional study completed by Aldhahir et al. (2022) measured the physicians' referring rate of COPD patients to pulmonary rehabilitation and identified barriers and factors that may affect the decision to refer. An online survey was sent to 502 physicians, including general and specialized physicians, internal medicine specialists, pulmonologists, and other physicians who had worked with COPD patients. The result was that 73% of general physicians had either never referred COPD patients to a PR program or were unsure if they had. While 54.5% of pulmonologists had a higher referral rate than other physicians. In addition, pulmonologists were almost four times as likely as general physicians to refer patients with COPD to a PR program. Moreover, regardless of specialty, physicians who have less than one year of experience with COPD patients compared to physicians with one to two years of experience were three times more likely to refer patients with COPD to a PR program.

Therefore, the authors found that COPD patients were more likely to be referred to PR by physicians who had more years of experience. The researchers also assessed the patient-related factors that impacted the decision to refer the patient for pulmonary rehabilitation. And they found that mobility affected by breathlessness (74.0%), decreased activity levels (72.0%), low exercise tolerance (68.0%), and patients' education and illness management (65.0%) were the major factors affecting the referral decisions. In addition, they investigated the factors influencing the decision not to refer COPD patients to PR. The availability of PR facilities (69.0%), lack of experienced personnel who can handle COPD patients (55.0%), patient co-morbidities (51.0%), and patients refusing referral (46.0%) were the variables that have

significantly influenced physicians not to refer patients with COPD to PR. Overall, participants agreed that by offering more PR centers and trained staff, the referring rate would be significantly improved.

A qualitative study using semi-structured interviews was conducted by Johnston et al. (2013) to evaluate barriers that prevent general practitioners from referring patients with COPD to PR programs. Twelve general practitioners who had over 20 years of experience took part in this study. This study revealed that 10 of the 12 general practitioners interviewed had not directly referred COPD patients to PR programs. The authors found that the primary barriers to referring COPD patients to PR were lack of knowledge of PR in the management of people with COPD, low knowledge of the referral process, difficulties with accessing PR centers by their patients, and questions about the need to further promote exercise behavior change in this patient group. In summary, general practitioners believed it would increase referral rates by integrating PR into routine care through financial incentives, improving the flow of information about the referral, and educating the public about the benefits of pulmonary rehabilitation.

Gushken et al. (2021) identified barriers encountered in the referral of patients with COPD to pulmonary rehabilitation. This was a cross-sectional study, with 72 physicians responding to the survey. The study found that there were three most common barriers to the referral of COPD patients: issues with health insurance coverage (79%), transportation to the pulmonary rehabilitation center (63%), and lack of social support (29%). Another barrier to reducing referral rates can be physician knowledge gaps. Accordingly, 74% of the physicians believed that improving the awareness and education of the benefits of PR programs among physicians would increase the PR referral rate. Overall, the authors conclude that education

sessions for physicians, integration of automatic reminders in electronic medical records, and the use of telerehabilitation tools can improve referrals to PR.

Healthcare providers' perceptions of pulmonary rehabilitation

Understanding and knowing the healthcare providers' perceptions of pulmonary rehabilitation for COPD patients had a positive impact on increasing the referral rate and improving pulmonary rehabilitation centers. Further research is needed to highlight health professionals' perceptions of the referral process and the perspectives of secondary care providers (Swift et al. 2021).

Swift et al. (2021) performed a systematic review to evaluate the perceptions of health professionals who could refer patients to PR and who work in PR centers. The authors found that a lack of knowledge and negative perceptions about pulmonary rehabilitation led to less effective management strategies among COPD patients. As a result, healthcare professionals need further education and training sessions on non-pharmacological management strategies. As well as PR programs, they should explore ways to raise awareness about the services for patients with COPD. Finally, healthcare providers who work in PR should consider ways to encourage physicians to refer COPD patients to PR.

A cross-sectional study completed by Aldhahir et al. [2022] assessed physicians' perceptions of referring COPD patients to PR, the mode of administration, and a component of PR. 502 physicians participated in this study. As a result, 62% strongly agreed that PR would enhance the exercise capacity of patients, while 27% agreed. Furthermore, 55% strongly agreed and 31% agreed that PR would reduce dyspnea and fatigue in COPD patients. Most physicians agreed PR would enhance the quality of life for COPD patients, 56% strongly agreed and 34.7% agreed. In addition, 51.6% of the physicians strongly agreed and 32.5% agreed that PR would

reduce the risk of future COPD exacerbation. Additionally, 53.6% strongly agreed and 33.3% agreed that PR would improve self-management of the disease among patients. And 75.5% of physicians thought the delivery of a home PR program was the best option, while 63.9% supported supervised programs in hospitals. In contrast, 22.3% showed that telerehabilitation was the least used method for delivering a PR program. Overall, doctors found that smoking cessation, symptom management, and COPD management were the major components of PR programs.

COPD patients' perceptions of pulmonary rehabilitation

Xie et al. (2020) conducted a cross-sectional study to address COPD patients' attitudes and practices toward pulmonary rehabilitation in China. The purpose of this study was to evaluate the attitudes, perceptions, and practices of patients with COPD towards PR in various centers to determine the reasons for non-adherence with PR. The results will help clarify the situation of the PR program from the perspective of patients with COPD and provide reasons for promoting PR in clinical practice. From 13 hospitals, 1138 COPD patients participated in the study and were asked to fill out a questionnaire. As for attitudes towards PR, only 46.22% of the group felt they needed PR, and 30.76% did not know if they needed it. In terms of PR practices, the authors found that only 24.69% of participants received PR therapy. The researchers also looked at the effects of PR on patients who received PR treatment. Among the 281 patients who received PR treatment, 97.15% thought it was effective for their health status. Specifically, 93.24% of participants believed that PR had improved their exercise tolerance, and 22.42% felt that their exercise tolerance had improved significantly. In addition, the authors examined the support of family members of patients who received PR, and 49.11% of family members encouraged the patients. Poor perception, disbelief in the need for PR, and a low referral rate

were commonly found among COPD patients in China. Results from this study could encourage healthcare workers to develop plans and strategies to improve PR perceptions and adherence rates in COPD patients.

Summary

Pulmonary rehabilitation has shown important improvements in patients with chronic lung disease, regardless of their baseline level of lung function. Most recent studies have focused on the effectiveness and benefits of PR. For COPD patients, PR has been effective in improving lung function, improving exercise tolerance, reducing mortality rates, reducing the frequency of exacerbations, and improving quality of life. Healthcare providers and physicians are at the forefront of the management of patients with COPD.

Despite the benefits of PR, there has been a significant reduction in referral rates for patients with COPD. Therefore, more studies are needed to evaluate the perceptions and awareness of healthcare students toward pulmonary rehabilitation programs among COPD patients. Overall, the positive perceptions toward PR are related to increasing referral rates and improving COPD management strategies.

Chapter III

Methodology

In this descriptive, cross-sectional study, the researcher explored healthcare students' perceptions toward pulmonary rehabilitation programs for COPD patients at Georgia State University. The researcher used a self-administered survey to evaluate the perceptions of students in various healthcare disciplines, including nursing, respiratory therapy, physical therapy, occupational therapy, and nutrition therapy. This chapter focuses on the methodology and procedures used to conduct the data of this study.

Study questions

This chapter focuses on the methods and the instrument that used in this study to answer the following research questions:

1. What are healthcare students' perceptions toward pulmonary rehabilitation programs for COPD patients?
2. Are Respiratory therapy students more familiar with pulmonary rehabilitation programs for COPD than other healthcare students?
3. Do healthcare students with more experience attending pulmonary rehabilitation programs have more positive perceptions compared to students with less experience?
4. What do healthcare students think about the factors that could influence COPD patients' decision not to participate in the pulmonary rehabilitation program?

Instrumentation

The instrument used in this study is a 38-item survey measuring the perceptions of healthcare students toward pulmonary rehabilitation programs. The survey was examined for face validity by three respiratory therapy educators from Georgia State University (GSU). The

survey instrument includes four sections to collect data from participants (Appendix A). These sections were: demographic data, experience with PR and COPD, students' perceptions of factors that affect COPD patients from attending PR programs, and students' perception toward PR. Section I consists of four questions about demographic data such as gender, age, level of education, professional program, and years in the professional program. Section II consists of five questions about pulmonary rehabilitation experience and COPD disease. Section III includes thirteen questions evaluating students' perceptions of the factors that affect COPD patients from attending PR programs. Section IV consists of sixteen questions evaluating a student's perception, and for each of the statements, the respondents have five different options to choose from. A Five-point Likert Scale ranging from 1 (strongly disagree) to 5 (strongly agree). Overall, the survey was adjusted to accept only one answer for each question.

Research Design

A descriptive research design and a cross-sectional survey were used. The survey will be distributed to the students in their classrooms. In addition, surveys are one of the most convenient methods of collecting data in scientific research (Burns et al., 2008). Overall, the purpose of a survey study is to collect a large amount of data from a large number of respondents in a short period.

Sample

A convenience sample was used in this cross-sectional study. The inclusion criteria for this study include healthcare students currently enrolled in health professional programs at Georgia State University. Exclusion criteria are any participants who are not enrolled in GSU and not healthcare students.

Data Collection

Georgia State University Institutional Review Board (IRB) permission was obtained before conducting this research to protect human subjects' rights (Appendix B). Confidentiality is granted since no personal information was collected from participants. The survey was developed by the investigator with the assistance and approval of the committee.

Informed Consent

In addition to the survey, informed consent was obtained before the participants fill out the survey (Appendix C). Participants were asked to agree to complete the survey by turning the page and completing the survey; if the participant refuses to participate in the study, the survey will be completed before any further steps.

Data Analysis

The latest version of the Statistical Package for the Social Sciences (SPSS version 28) was used to analyze the collected data. Descriptive statistics, including mean, frequency, percentage, and standard deviation, were analyzed to assess and identify differences in the demographic data of the sample. And a Kruskal-Wallis test was done to identify statistically significant differences in perceptions of PR programs among health students. Moreover, Chi-Square tests were conducted to determine statistically significant differences in the familiarity with PR programs for COPD between RT students and other healthcare students. Lastly, a correlation test was applied to evaluate the association between the experience of participating in PR and positive perceptions toward PR in a multidisciplinary sample of healthcare students.

Summary

This chapter outlines the instrument, sample inclusion and exclusion criteria, informed consent, IRB approval, data collection, and analysis. Participants were assured that they would

not be harmed by this study and that their information would be protected. Moreover, the main objective of the study was to evaluate the perceptions of healthcare students toward pulmonary rehabilitation for COPD patients. Once the data was collected, a statistical analysis was performed to evaluate the perceptions among healthcare students at GSU.

Chapter IV

Results

This chapter aimed to evaluate the healthcare students' perceptions toward pulmonary rehabilitation programs for COPD patients and to differentiate between students' perceptions based on their major and PR experience.

Research Questions

1. What are healthcare students' perceptions toward pulmonary rehabilitation programs for COPD patients?
2. Are Respiratory therapy students more familiar with pulmonary rehabilitation programs for COPD than other healthcare students?
3. Do healthcare students with more experience attending pulmonary rehabilitation programs have more positive perceptions compared to students with less experience?
4. What do healthcare students think about the factors that could influence COPD patients' decision not to participate in the pulmonary rehabilitation program?

Demographic Findings

The study was conducted at Georgia State University. This study included a convenience sample of undergraduate and graduate healthcare students. A total of 178 participants from three programs; respiratory therapy, physical therapy, and occupational therapy. The majority of respondents were respiratory therapy students n=77 (43.3%); followed by physical therapy n=71 (39.9%); occupational therapy n=30 (16.9%). Female participants were 139 (78.1%) and male participants were 39 (21.9%). The age groups of participants under 25 were n=148, from 26 to 35 were n=27, from 36 to 45 were n=2, and from 46 to 55 were n=1. The majority of the participants were bachelor's degree n=104 (58.4%), master's degree n=11 (6.2%), DPT n=40

(22.5%), and OTD n=23 (12.9%). Most of the participants were in their first year in the program n=109 (61.2%); followed by the second year in the program n=63 (35.4%); and the fourth year in the program n=6 (3.4%). The demographic data characteristics of all participants are summarized in (Table 1).

Table 1 Demographic data and characteristics of all participants (n = 178).

		N	N %
Gender	Male	39	21.9%
	Female	139	78.1%
Age Groups	under 25	148	
	26-35	27	
	36-45	2	
	46-55	1	
	56 and older	0	
Program	Respiratory Therapy	77	43.3%
	Physical Therapy	71	39.9%
	Occupational Therapy	30	16.9%
	Other	0	0.0%
Education	Bachelor	104	58.4%
	Master	11	6.2%
	OTD	23	12.9%
	DPT	40	22.5%
	PhD	0	0.0%
level of program	First	109	61.2%
	Second	63	35.4%
	Third	0	0.0%
	Fourth	6	3.4%
	Other	0	0.0%

OTD= Occupational Therapy Doctorate, DPT= Doctor of Physical Therapy program.

Findings Related to Research Question 1

The first research question asked, “What are healthcare students' perceptions toward pulmonary rehabilitation programs for COPD patients?” Data results were tabulated in Table 2, which includes item numbers in the survey, survey statements, the mean score and standard deviation of perceptions of all healthcare students participating in the study, and students' perceptions of respiratory therapy, physical therapy, and occupational therapy programs. Participants answered this research question via 16 statements on a 5-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree."

Generally, healthcare students reported the strongest agreement with the statement that "I can see the potential value of a pulmonary rehabilitation (PR) program for COPD patients" with a total mean score of M=4.64 and standard deviation of (SD±.64). Whereas the statement that " Attendance at PR programs should be part of my clinical practice so that healthcare students are aware of the effectiveness of PR" got the least agreement in response with a total mean score of M=3.97 and standard deviation of (SD±.94). (See table 2).

Furthermore, the findings show that respiratory therapy students have positive perceptions toward PR programs for COPD patients and their highest agreement was to the statement that "It is important for me to recognize common signs and symptoms of COPD as a healthcare student" with a mean score of M= 4.77 (SD±.63). In contrast, their lowest agreement was to the statement that " Attendance at PR programs should be part of my clinical practice so that healthcare students are aware of the effectiveness of PR," with a mean score of M=4.12 (SD±1.03). (See table 2).

Likewise, the findings show that physical therapy students positively respond to PR programs. Physical therapy students demonstrated the most robust agreement with this statement:

" Smoking cessation should be a component of PR programs," with a mean score and standard deviation of 4.69 (±.62). Nevertheless, physical therapy students least agreed to "Attendance at PR programs should be part of my clinical practice so that healthcare students are aware of the effectiveness of PR," with a mean score of 3.93 and standard deviation (±.88). (See table 2).

The study also reported that occupational therapy students have their highest agreement was to the statement " Psychological support should be a component of PR programs" with a mean score of M=4.67(SD±.48). While the occupational therapy students' least agreement was in the statement that " I believe PR will improve the nutritional status of COPD patients" with a mean score of 3.50 (±.97). (See table 2).

A Kruskal-Wallis test showed statistically significant differences in students' perceptions of PR programs between the healthcare programs within these statements. "It is important for me to understand COPD and COPD management in my degree program" ($p < 0.001$), "It is important for me to recognize common signs and symptoms of COPD as a healthcare student" ($p < 0.003$), "I believe PR will improve exercise capacity in COPD patients" ($p < 0.021$), "I believe PR would reduce dyspnea and fatigue in COPD patients" ($p < 0.006$), "I believe PR will reduce hospital readmission in COPD patients" ($p < 0.033$), "I believe PR will improve the nutritional status of COPD patients" ($p < 0.003$), "attendance at PR programs should be part of my clinical practice so that healthcare students are aware of the effectiveness of PR" ($p < 0.014$), and "PR education sessions should be included in my program to ensure that healthcare students are aware of how effective PR is" ($p < 0.003$). (See table 2).

Table 2 Healthcare students' perceptions toward pulmonary rehabilitation programs

Item No.	Survey Statement	Total Mean (±SD)	Respiratory Therapy Mean (±SD)	Physical Therapy Mean (±SD)	Occupational Therapy Mean (±SD)	P-Value
1	It is important for me to understand COPD and COPD management in my degree program	4.52(± .69)	4.73(± .66)	4.39(± .72)	4.27(± .52)	**<.001***
2	It is important for me to recognize common signs and symptoms of COPD as a healthcare student	4.64(± .59)	4.77(± .63) *	4.58(± .58)	4.53(± .51)	**.003***
3	I can see the potential value of a pulmonary rehabilitation (PR) program for COPD patients	4.64(± .64) *	4.66(± .68)	4.62(± .62)	4.63(± .61)	**.736**
4	I believe PR will improve exercise capacity in COPD patients	4.52(± .65)	4.51(± .66)	4.62(± .64)	4.30(± .59)	**.021***
5	I believe PR would reduce dyspnea and fatigue in COPD patients	4.46(± .71)	4.44(± .77)	4.59(± .67)	4.20(± .61)	**.006***
6	I believe PR will improve anxiety and depression in COPD patients	4.22(± .82)	4.22(± .87)	4.32(± .77)	3.97(± .80)	**.092**
7	I believe PR will improve health-related quality of life in COPD patients	4.49(± .65)	4.51(± .62)	4.48(± .73)	4.47(± .57)	**.865**
8	I believe PR will reduce the risk of future COPD exacerbation	4.34(± .76)	4.34(± .79)	4.42(± .75)	4.13(± .68)	**.092**
9	I believe PR will reduce hospital readmission in COPD patients	4.29(± .77)	4.32(± .82)	4.38(± .74)	4.03(± .67)	**.033***
10	I believe PR will improve nutritional status of COPD patients	3.97(± .95) +	4.16(± .96)	3.97(± .88)	3.50(± .97) +	**.003***
11	I believe PR will improve disease self-management in COPD patients	4.34(± .74)	4.39(± .78)	4.37(± .74)	4.17(± .59)	**.108**
12	Attendance at PR programs should be part of my clinical practice so that healthcare students are aware of the effectiveness of PR	3.97(± .94) +	4.12(± 1.03) +	3.93(± .88) +	3.67(± .80)	**.014***

13	PR education sessions should be included in my program to ensure that healthcare students are aware of how effective PR is	4.20(± .78)	4.34(± .82)	4.21(± .72)	3.84(± .75)	**.003***
14	Smoking cessation should be a component of PR programs	4.58(± .69)	4.49(± .75)	4.69(± .62) *	4.57(± .68)	**.207**
15	Psychological support should be a component of PR programs	4.54(± .69)	4.51(± .70)	4.52(± .75)	4.67(± .48) *	**.718**
16	Nutritional counseling should be a component of PR programs.	4.39(± .79)	4.48(± .77)	4.35(± .85)	4.23(± .73)	**.163**

SD: Standard Deviation.
(*): Highest Score, (+): Lowest Score.
* The significant level is .050
Note: p-value was obtained from the Independent-Samples Kruskal-Wallis test.
Note: Means are based on a 5-point Likert scale in which 1 indicates strongly disagree and 5 indicates strongly agree. A score above 3.5 indicates agreement with the statement.

Findings Related to Research Question 2

The second question asked, " Are Respiratory therapy students more familiar with pulmonary rehabilitation programs for COPD than other healthcare students?". By answering the "yes/no " question, table 3 shows survey responses for familiarity with pulmonary rehabilitation programs. More than three-quarters of respiratory students n=63 (82%) answered yes to familiarity questions, around n=56 (76%) of physical therapy students, and n=18 (60%) of occupational therapy. (See Figure 1). And there was no significant difference in the familiarity with PR programs between respiratory therapy students and other healthcare students. (Table 3).

Table 3 Familiar with pulmonary rehabilitation programs between healthcare students

		Program						Total	
		Respiratory Therapy		Physical Therapy		Occupational Therapy			
		N	%	N	%	N	%	N	%
Familiar PR	Yes	63_a	81.8%	54_a	76.1%	18_a	60.0%	135	75.8%
	No	14_a	18.2%	17_a	23.9%	12_a	40.0%	43	24.2%
Total		77	100.0%	71	100.0%	30	100.0%	178	100.0%
Chi-Square Tests p-value								.060	

Each subscript letter denotes a subset of Program categories whose column proportions do not differ significantly from each other at the .05 level.

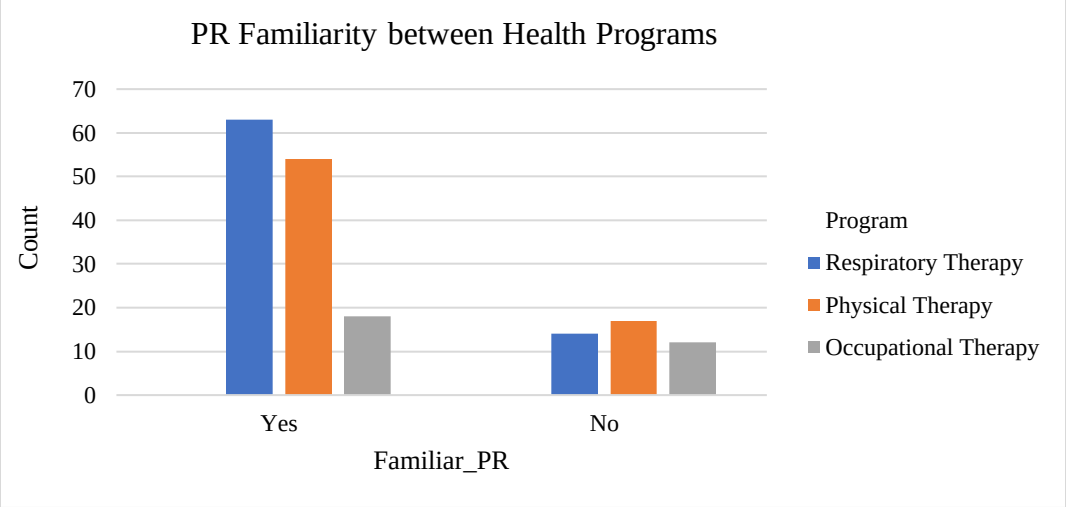


Figure 1 Familiar with pulmonary rehabilitation programs between healthcare students

Findings Related to Research Question 3

The third question asked, " Do healthcare students with more experience attending pulmonary rehabilitation programs have more positive perceptions compared to students with less experience?" Responses to four survey statements regarding perceptions towards pulmonary rehabilitation were tabulated and presented in table 5. There was a significant difference in the perceptions between students who had experience attending or assisting in pulmonary

rehabilitation programs and those who had no experience with a mean score of 4.67 (±.55) vs. 4.33 (±.83) (p=.043) for this statement "Nutritional counseling should be a component of PR programs". And no significant difference was found in the other surveys' statements.

Table 4 Experience in Healthcare students and the perceptions toward PR programs

No.	Survey Statement	Yes experience. Mean (±SD)	No experience Mean (±SD)	P-Value
1	I can see the potential value of a pulmonary rehabilitation (PR) program for COPD patients.	**4.77(± .42)**	**4.61(± .67)**	**.310**
2	Smoking cessation should be a component of PR programs.	**4.56(± .64)**	**4.59(± .71)**	**.655**
3	Psychological support should be a component of PR programs.	**4.63(± .56)**	**4.52(± .72)**	**.548**
4	Nutritional counseling should be a component of PR programs.	**4.67(± .55)**	**4.33(± .83)**	**.043**

*The significant level is .050
Note: p-value was obtained from the Mann-Whitney U test.
Means are based on a 5-point Likert scale in which 1 indicates strongly disagree and 5 indicates strongly agree. A score above 3.5 indicates agreement with the statement.

Findings Related to Research Question 4

In order to assess students' perceptions toward factors that could influence COPD patients' decision not to participate in the pulmonary rehabilitation program, 12 statements were addressed for the responders to state that the statement is SD= strongly disagree, D= disagree, N= neutral, A= agree, SA= strongly agree. In this section, all healthcare students including respiratory, physical, and occupational therapy students reported the strongest agreement with the statement "Treatment cost" with a total mean score of M=4.49 and standard deviation of (SD±.74) of RTS, M=4.32 (SD±.81) of PTS, and M=4.33 (SD±.71) of OTS. Whereas the statement " Lack of experienced staff who can manage COPD patients in PR program" got the least agreement in response with a total mean score of M=3.52 (SD±1.14) of RTS, M=3.47 (SD±.95) of PTS, and M=3.43 (SD±.89) of OTS. (See Figure 3). A Kruskal-Wallis test showed

that there were no statistically significant differences in students' perceptions toward factors that could influence COPD patients' decisions among healthcare students. (See table 6).

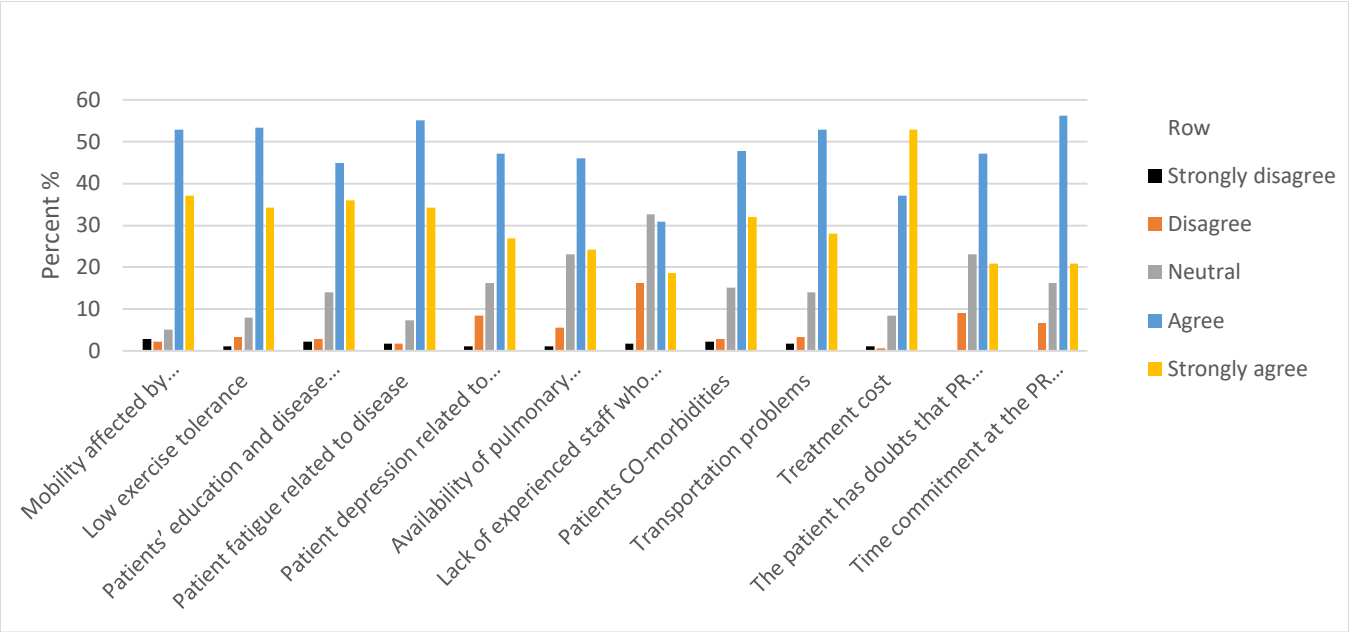


Figure 2 Factors that could influence COPD patients' decision not to participate in the PR programs

Table 5 Perceptions toward factors that could influence COPD patients' decision not to participate in the PR programs

Item No.	Survey Statement	Total Mean (±SD)	Respiratory Therapy Mean (±SD)	Physical Therapy Mean (±SD)	Occupational Therapy Mean (±SD)	P-Value
1	Mobility affected by breathlessness	4.19(± .86)	4.12(± 1.01)	4.21(± .77)	4.33(± .55)	**.894**
2	Low exercise tolerance	4.16(± .79)	4.09(± .91)	4.19(± .79)	4.23(± .45)	**.824**
3	Patients' education and disease management	4.09(± .90)	3.98(± 1.01)	4.23(± .79)	4.07(± .83)	**.363**
4	Patient fatigue related to disease	4.19(± .78)	4.10(± .87)	4.27(± .76)	4.20(± .55)	**.442**
5	Patient depression related to disease	3.90(± .93)	3.85(± 1.09)	3.87(± .83)	4.10(± .66)	**.553**
6	Availability of pulmonary rehabilitation PR programs	3.86(± .89)	3.75(± .93)	3.96(± .81)	3.93(± .94)	**.445**

7	Lack of experienced staff who can manage COPD patients in PR program	3.48(± 1.03)+	3.52(± 1.14)+	3.47(± .95)+	3.43(± .89)+	**.852**
8	Patients CO-morbidities	4.04(± .89)	3.89(± 1.05)	4.18(± .82)	4.10(± .48)	**.203**
9	Transportation problems	4.02(± .84)	4.03(± .95)	4.04(± .80)	3.97(± .67)	**.611**
10	Treatment cost	4.39(± .76) *	4.49(± .74)*	4.32(± .81)*	4.33(± .71) *	**.255**
11	The patient has doubts that PR is worthwhile	3.79(± .87)	3.74(± .92)	3.88(± .84)	3.73(± .83)	**.532**
12	Time commitment at the PR program	3.91(± .79)	3.94(± .86)	3.90(± .77)	3.87(± .68)	**.782**

*The significant level is .050
Note: p-value was obtained from the Independent-Samples Kruskal-Wallis test.
(*): Highest Score, (+): Lowest Score.
Means are based on a 5-point Likert scale in which 1 indicates strongly disagree and 5 indicates strongly agree. A score above 3.5 indicates agreement with the statement.

Chapter V

Discussion

The aim of this chapter is to discuss the findings presented in Chapter IV. The chapter includes six major parts: an overview of the study, a discussion of findings, implications for research, future research recommendations, limitations of the study, and a conclusion.

Overview of the Study

The purpose of this descriptive study was to evaluate healthcare students' perceptions toward pulmonary rehabilitation programs for COPD patients. Data were collected from three healthcare programs in an urban setting. The following research questions guided the study:

1 What are healthcare students' perceptions toward pulmonary rehabilitation programs for COPD patients?

2 Are Respiratory therapy students more familiar with pulmonary rehabilitation programs for COPD than other healthcare students?

3 Do healthcare students with more experience participating in pulmonary rehabilitation programs have more positive perceptions compared to students with less experience?

4 What do healthcare students think about the factors that could influence COPD patients' decision not to participate in the pulmonary rehabilitation program?

Discussion

The first question asked, " What are healthcare students' perceptions toward pulmonary rehabilitation programs for COPD patients? " The overall findings of this question disclose that healthcare students had positive perceptions toward PR programs for COPD patients. This result goes in the same direction with Aldhahir and colleagues (2022) when they assessed physicians' perceptions of referring COPD patients to PR. They conclude that physicians have a positive

perception of PR and recognize its potential benefits in improving exercise capacity, reducing dyspnea and fatigue, enhancing the quality of life, reducing exacerbation risk, and improving self-management among COPD patients.

Generally, health care students showed a positive perception toward PR programs for COPD based on their calculated mean and standard deviation for the 16 perception statements, as they scored a mean of more than 4.00 for most of the perception statements, except for the following statements. The statement, "I believe PR will improve nutritional status of COPD patients" received the lowest agreement in response with a mean score of M=3.97 and standard deviation of (SD± .95), which illustrates a negative perception toward the PR programs. This kind of program typically include components such as patient assessment, exercise training, smoking cessation, nutritional counselling, and psychosocial support (Aldhahir et al, 2020). And it has been suggested that nutritional support and counselling integrated with exercise training may improve exercise activity, decrease mortality and improve muscle strength among undernourished COPD patients (Schols, 2003). Likewise, the statement "Attendance at PR programs should be part of my clinical practice so that healthcare students are aware of the effectiveness of PR", received low agreement in response with a mean score of M= 3.97 and standard deviation of (SD± .94). Healthcare students believed that they do not need to participate and attend PR programs as a student, however Chen et al. (2017) approved that, respiratory therapists with PR experience at a PR program showed a better positive perception toward PR compared to RTs with no experience.

Healthcare students showed a negative perception to two perception statements only, whereas the rest of the perception statements revealed a positive perception. The findings from our study emphasize the need to establish educational sessions for healthcare students toward

PR. That supports the idea that education background and experience in PR programs have a better awareness of PR benefits.

The second question asked, "Are Respiratory therapy students more familiar with pulmonary rehabilitation programs for COPD than other healthcare students?" There was no significant difference in the familiarity with PR programs between respiratory therapy students and other healthcare students. According to our findings, respiratory students (18%) answered no to familiarity questions, around (24%) of physical therapy students, and (40%) of occupational therapy. Participants used in the study are at different program levels, which provides insufficient power to detect significant effects on familiarity with PR and explains the insignificant difference found between respiratory therapy students and other healthcare students. However, the familiarity of PR among healthcare practitioners differs between studies. Yawn and Wollan (2008) assessed the familiarity and knowledge of PR benefits in a sample of family medicine physicians and nursing practitioners. They found that only 3% of the participants were generally familiar with the benefits, and 16% remained neutral. Contrary to Chen and colleagues (2017) findings that showed that most respiratory therapists (63%) acknowledge the benefits of PR for COPD patients. Although our study included a limited sample of respiratory therapy students, they showed high levels of awareness and positive perceptions toward PR programs (82%). These findings emphasize that respiratory therapy students are the most up-to-date with current PR program studies and more familiar with managing respiratory conditions than other healthcare professions.

The third question asked, "Do healthcare students with more experience participating in pulmonary rehabilitation programs have more positive perceptions compared to students with less experience?" There was a significant difference in the perceptions between students who had

experience attending or assisting in pulmonary rehabilitation programs and those who had no experience. Healthcare students with experience participating in PR programs showed more positive perceptions regarding PR benefits. These results are aligned with Chen et al. (2017) findings. According to Chen et al. (2017), respiratory therapists with PR experience at a PR center showed a greater level of PR knowledge than those without (p=0.009). This finding supports the idea that clinical experiences for healthcare students in PR programs lead to have better positive perceptions toward PR.

The fourth research question asked, " What do healthcare students think about the factors that could influence COPD patients' decision not to participate in the pulmonary rehabilitation program?" The study showed that there were no statistically significant differences in students' perceptions toward factors that could influence COPD patients' decisions among healthcare students. The findings reported that the strongest agreement was for the statement "Treatment cost" with a total mean score of M=4.39 and standard deviation of (SD±.76). Similarly, Gushken et al (2021) found that the main barriers to PR referral reported by physicians were health insurance coverage (79%; 57). According to Medicare which is federal health insurance in US, Medicare cover up to two 1-hour sessions per day for up to 36 days of PR for a person with moderate to severe COPD and for some individuals, coverage may extend to 72. Whereas the statement " Lack of experienced staff who can manage COPD patients in PR program" got the least agreement in response with a total mean score of M=3.48 (SD±1.03). Aldhahir and colleagues (2022) assessed physicians' beliefs about the factors and barriers that might influence referral decisions and found that "the availability of PR centers" (69%) was the major barrier to PR referral followed by "lack of well-trained staff" (55%). The finding supports the idea that

COPD management by a multidisciplinary team is much better. The study highlights the need to implement educational sessions for healthcare students on how to manage COPD.

Implications for Research

The study findings offer valuable insights into how healthcare students perceive pulmonary rehabilitation programs for COPD patients. The information obtained from this study can be utilized to develop targeted interventions aimed at improving understanding of the benefits of PR among healthcare students. These findings highlight the importance of providing healthcare students with opportunities to gain clinical experience by participating in and attending PR programs for better awareness. Furthermore, the positive perceptions of PR programs may help develop PR courses in the healthcare professions' curriculum. This study emphasizes the significance of PR programs and underscores the need to promote their importance in the education and training of healthcare students.

Limitations

The study had some limitations which should be taken into consideration. Firstly, the sample size was relatively small when compared to the total number of healthcare students in a GSU. Secondly, the study focused on only one educational institution, which restricted the generalizability of the findings to a broader population. Despite the limitations of this study, this is the first study, to the best of our knowledge, to explore the perception of healthcare students toward PR programs for COPD patients.

Recommendations

Due to a lack of research on healthcare students' perceptions toward pulmonary rehabilitation programs for COPD patients, future research is highly recommended. Replication

of this study is strongly advised to generalize these findings with a larger sample size of various healthcare professions and multiple educational institutions.

Conclusion

Healthcare students value and have a positive perception toward pulmonary rehabilitation programs for COPD patients. The study's findings revealed that experience positively impacts the perception toward PR programs. Moreover, this study supports the idea of the implantation of pulmonary rehabilitation courses throughout the healthcare program curriculum. Overall, healthcare students felt that they had an important role in pulmonary rehabilitation programs, but barriers to participating and assisting in PR programs included their own lack of knowledge and clinical experience. They considered that there should be more teaching on pulmonary rehabilitation and that these should feature in both the curriculum and clinical.

References

Aldhahir, A. M., Alqahtani, J. S., Alghamdi, S. M., Alqarni, A. A., Khormi, S. K., Alwafi, H., Samannodi, M., Siraj, R. A., Alhotye, M., Naser, A. Y., & Hakamy, A. (2022). Physicians' Attitudes, Beliefs and Barriers to a Pulmonary Rehabilitation for COPD Patients in Saudi Arabia: A Cross-Sectional Study. Healthcare (Basel, Switzerland), 10(5), 904. https://doi.org/10.3390/healthcare10050904

Aldhahir, A. M., Rajeh, A. M. A., Aldabayan, Y. S., Drammeh, S., Subbu, V., Alqahtani, J. S., Hurst, J. R., & Mandal, S. (2020). Nutritional supplementation during pulmonary rehabilitation in COPD: A systematic review. Chronic respiratory disease, 17, 1479973120904953. https://doi.org/10.1177/1479973120904953

Azarisman, S. M., Hadzri, H. M., Fauzi, R. A., Fauzi, A. M., Faizal, M. P., Roslina, M. A., & Roslan, H. (2008). Compliance to national guidelines on the management of chronic obstructive pulmonary disease in Malaysia: a single centre experience. Singapore medical journal, 49(11), 886–896.

Bolton, C. E., Bevan-Smith, E. F., Blakey, J. D., Crowe, P., Elkin, S. L., Garrod, R., Committee, on behalf of the B. T. S. S. of C. (2013). British Thoracic Society guideline on pulmonary rehabilitation in adults: accredited by NICE. Thorax, 68(Suppl 2), ii1–ii30. https://doi.org/10.1136/thoraxjnl-2013-203808.

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

Burns, K. E., Duffett, M., Kho, M. E., Meade, M. O., Adhikari, N. K., Sinuff, T., Cook, D. J., & ACCADEMY Group (2008). A guide for the design and conduct of self-administered surveys of clinicians. CMAJ : Canadian Medical Association journal = journal de l'Association medicale canadienne, 179(3), 245–252. https://doi.org/10.1503/cmaj.080372

Chen, Y. J., Fan, J. Y., Guo, S. E., Hwang, S. L., & Yang, T. M. (2017). Factors facilitating and hindering the intention to promote pulmonary rehabilitation for patients with COPD among respiratory therapists. International journal of chronic obstructive pulmonary disease, 12, 2695–2702. https://doi.org/10.2147/COPD.S142124

Clini, E., Roversi, P., & Crisafulli, E. (2010). Early rehabilitation: much better than nothing. American journal of respiratory and critical care medicine, 181(10), 1016–1017. https://doi.org/10.1164/rccm.201001-0054ED

Garrod, R., Marshall, J., Barley, E., & Jones, P. W. (2006). Predictors of success and failure in pulmonary rehabilitation. The European respiratory journal, 27(4), 788–794. https://doi.org/10.1183/09031936.06.00130605

Garvey, C., Bayles, M. P., Hamm, L. F., Hill, K., Holland, A., Limberg, T. M., & Spruit, M. A. (2016). Pulmonary Rehabilitation Exercise Prescription in Chronic Obstructive Pulmonary Disease: Review of Selected Guidelines: AN OFFICIAL STATEMENT FROM THE AMERICAN ASSOCIATION OF CARDIOVASCULAR AND PULMONARY REHABILITATION. Journal of cardiopulmonary rehabilitation and prevention, 36(2), 75–83. https://doi.org/10.1097/HCR.0000000000000171

Gushken, F., Degani-Costa, L. H., Colognese, T., Rodrigues, M. T., Zanetti, M., Bonamigo-Filho, J. L., & Matos, L. (2021). Barriers to enrollment in pulmonary rehabilitation:

medical knowledge analysis. Einstein (Sao Paulo, Brazil), 19, eAO6115. https://doi.org/10.31744/einstein_journal/2021AO6115

He, M., Yu, S., Wang, L., Lv, H., & Qiu, Z. (2015). Efficiency and safety of pulmonary rehabilitation in acute exacerbation of chronic obstructive pulmonary disease. Medical science monitor : international medical journal of experimental and clinical research, 21, 806–812. https://doi.org/10.12659/MSM.892769

Johnston, K. N., Young, M., Grimmer, K. A., Antic, R., & Frith, P. A. (2013). Barriers to, and facilitators for, referral to pulmonary rehabilitation in COPD patients from the perspective of Australian general practitioners: a qualitative study. Primary care respiratory journal : journal of the General Practice Airways Group, 22(3), 319–324. https://doi.org/10.4104/pcrj.2013.00062

Johnson-Warrington, V., Harrison, S., Mitchell, K., Steiner, M., Morgan, M., & Singh, S. (2014). Exercise capacity and physical activity in patients with COPD and healthy subjects classified as Medical Research Council dyspnea scale grade 2. Journal of cardiopulmonary rehabilitation and prevention, 34(2), 150–154. https://doi.org/10.1097/HCR.0000000000000038

McCarthy, B., Casey, D., Devane, D., Murphy, K., Murphy, E., & Lacasse, Y. (2015). Pulmonary rehabilitation for chronic obstructive pulmonary disease. The Cochrane database of systematic reviews, (2), CD003793. https://doi.org/10.1002/14651858.CD003793.pub3

Moullec, G., Ninot, G., Varray, A., Desplan, J., Hayot, M., & Prefaut, C. (2008). An innovative maintenance follow-up program after a first inpatient pulmonary

rehabilitation. Respiratory medicine, 102(4), 556–566. https://doi.org/10.1016/j.rmed.2007.11.012

Pitta, F., Troosters, T., Probst, V. S., Langer, D., Decramer, M., & Gosselink, R. (2008). Are patients with COPD more active after pulmonary rehabilitation? Chest, 134(2), 273–280. https://doi.org/10.1378/chest.07-2655

Polatli, M., Ben Kheder, A., Wali, S., Javed, A., Khattab, A., Mahboub, B., Iraqi, G., Nejjari, C., Taright, S., Koniski, M.-L., Rashid, N., & El Hasnaoui, A. (2012). Chronic obstructive pulmonary disease and associated healthcare resource consumption in the Middle East and North Africa: The BREATHE study. Respiratory Medicine, 106, S75–S85. https://doi.org/10.1016/S0954-6111(12)70016-1

Puhan, M., Scharplatz, M., Troosters, T., Walters, E. H., & Steurer, J. (2009). Pulmonary rehabilitation following exacerbations of chronic obstructive pulmonary disease. The Cochrane database of systematic reviews, (1), CD005305. https://doi.org/10.1002/14651858.CD005305.pub2

Qaseem, A., Wilt, T. J., Weinberger, S. E., Hanania, N. A., Criner, G., van der Molen, T., Marciniuk, D. D., Denberg, T., Schünemann, H., Wedzicha, W., MacDonald, R., Shekelle, P., American College of Physicians, American College of Chest Physicians, American Thoracic Society, & European Respiratory Society (2011). Diagnosis and management of stable chronic obstructive pulmonary disease: a clinical practice guideline update from the American College of Physicians, American College of Chest Physicians, American Thoracic Society, and European Respiratory Society. Annals of internal medicine, 155(3), 179–191. https://doi.org/10.7326/0003-4819-155-3-201108020-00008

Ries, A. L., Bauldoff, G. S., Carlin, B. W., Casaburi, R., Emery, C. F., Mahler, D. A., Make, B., Rochester, C. L., Zuwallack, R., & Herrerias, C. (2007). Pulmonary Rehabilitation: Joint ACCP/AACVPR Evidence-Based Clinical Practice Guidelines. Chest, 131(5 Suppl), 4S–42S. https://doi.org/10.1378/chest.06-2418

Rochester, C. L., Vogiatzis, I., Holland, A. E., Lareau, S. C., Marciniuk, D. D., Puhan, M. A., Spruit, M. A., Masefield, S., Casaburi, R., Clini, E. M., Crouch, R., Garcia-Aymerich, J., Garvey, C., Goldstein, R. S., Hill, K., Morgan, M., Nici, L., Pitta, F., Ries, A. L., Singh, S. J., … ATS/ERS Task Force on Policy in Pulmonary Rehabilitation (2015). An Official American Thoracic Society/European Respiratory Society Policy Statement: Enhancing Implementation, Use, and Delivery of Pulmonary Rehabilitation. American journal of respiratory and critical care medicine, 192(11), 1373–1386. https://doi.org/10.1164/rccm.201510-1966ST

Ryrsø, C. K., Godtfredsen, N. S., Kofod, L. M., Lavesen, M., Mogensen, L., Tobberup, R., Farver-Vestergaard, I., Callesen, H. E., Tendal, B., Lange, P., & Iepsen, U. W. (2018). Lower mortality after early supervised pulmonary rehabilitation following COPD-exacerbations: a systematic review and meta-analysis. BMC pulmonary medicine, 18(1), 154. https://doi.org/10.1186/s12890-018-0718-1

Schols A. (2003). Nutritional modulation as part of the integrated management of chronic obstructive pulmonary disease. The Proceedings of the Nutrition Society, 62(4), 783–791. https://doi.org/10.1079/PNS2003303

Schroff, P., Hitchcock, J., Schumann, C., Wells, J. M., Dransfield, M. T., & Bhatt, S. P. (2017).

Pulmonary Rehabilitation Improves Outcomes in Chronic Obstructive Pulmonary Disease Independent of Disease Burden. Annals of the American Thoracic Society, 14(1), 26–32. https://doi.org/10.1513/AnnalsATS.201607-551OC

Spruit, M. A., Singh, S. J., Garvey, C., ZuWallack, R., Nici, L., Rochester, C., Hill, K., Holland, A. E., Lareau, S. C., Man, W. D., Pitta, F., Sewell, L., Raskin, J., Bourbeau, J., Crouch, R., Franssen, F. M., Casaburi, R., Vercoulen, J. H., Vogiatzis, I., Gosselink, R., … ATS/ERS Task Force on Pulmonary Rehabilitation (2013). An official American Thoracic Society/European Respiratory Society statement: key concepts and advances in pulmonary rehabilitation. American journal of respiratory and critical care medicine, 188(8), e13–e64. https://doi.org/10.1164/rccm.201309-1634ST

Strijbos, J. H., Postma, D. S., van Altena, R., Gimeno, F., & Koëter, G. H. (1996). A comparison between an outpatient hospital-based pulmonary rehabilitation program and a home-care pulmonary rehabilitation program in patients with COPD. A follow-up of 18 months. Chest, 109(2), 366–372. https://doi.org/10.1378/chest.109.2.366

Swift, E., O'Brien, M. R., Peters, S., & Kelly, C. (2022). Healthcare professionals' perceptions of pulmonary rehabilitation as a management strategy for patients with chronic obstructive pulmonary disease: a critical interpretive synthesis. Disability and rehabilitation, 44(4), 520–535. https://doi.org/10.1080/09638288.2020.1769745

Vogelmeier, C. F., Criner, G. J., Martinez, F. J., Anzueto, A., Barnes, P. J., Bourbeau, J., Celli, B. R., Chen, R., Decramer, M., Fabbri, L. M., Frith, P., Halpin, D. M., López Varela, M. V., Nishimura, M., Roche, N., Rodriguez-Roisin, R., Sin, D. D., Singh, D., Stockley, R., Vestbo, J., … Agustí, A. (2017). Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Lung Disease 2017 Report. GOLD Executive

Summary. American journal of respiratory and critical care medicine, 195(5), 557–582. https://doi.org/10.1164/rccm.201701-0218PP

Wheaton, A. G., Cunningham, T. J., Ford, E. S., Croft, J. B., & Centers for Disease Control and Prevention (CDC) (2015). Employment and activity limitations among adults with the chronic obstructive pulmonary disease--United States, 2013. MMWR. Morbidity and mortality weekly report, 64(11), 289–295.

Wijkstra, P. J., Ten Vergert, E. M., van Altena, R., Otten, V., Kraan, J., Postma, D. S., & Koëter, G. H. (1995). Long term benefits of rehabilitation at home on quality of life and exercise tolerance in patients with chronic obstructive pulmonary disease. Thorax, 50(8), 824–828. https://doi.org/10.1136/thx.50.8.824

World Health Organisation. WHO guidelines on physical activity and sedentary behaviour; 2020.

Xie, L., Liu, Z., Hao, S., Wu, Q., Sun, L., Luo, H., Yu, R., Li, X., Wu, X., & Li, S. (2020). Assessment of knowledge, attitude, and practice towards pulmonary rehabilitation among COPD patients: A multicenter and cross-sectional survey in China. Respiratory medicine, 174, 106198. https://doi.org/10.1016/j.rmed.2020.106198

Xu, J., Murphy, S. L., Kockanek, K. D., & Arias, E. (2020). Mortality in the United States, 2018. NCHS data brief, (355), 1–8.

Yawn, B. P., & Wollan, P. C. (2008). Knowledge and attitudes of family physicians coming to COPD continuing medical education. International journal of chronic obstructive pulmonary disease, 3(2), 311–317. https://doi.org/10.2147/copd.s2486

Appendix A: Questionnaire to Assess the Perceptions of Healthcare Students Toward Pulmonary Rehabilitation Programs for COPD Patients

Survey Questionnaire

Perceptions of healthcare students toward pulmonary rehabilitation programs for COPD patients

Section I. Demographic data

1. **Gender:**

   ☐ Female ☐ Male

2. **Current Age in years:** _____

3. **Level of Education:** ☐ Bachelor ☐ Master ☐ OTD ☐ DPT ☐ DNP ☐ PhD

4. **In which healthcare professional program are you currently enrolled?**

   ☐ Nursing ☐ Respiratory Therapy ☐ Physical Therapy ☐ Occupational Therapy

   ☐ Nutrition ☐ Others, please specify _____

5. **Year in professional program:**

   ☐ First
   ☐ Second
   ☐ Third
   ☐ Fourth
   ☐ Other, please specify _____

Section II. General

1. Are you familiar with pulmonary rehabilitation?

   □ Yes □ No

2. Do you have a didactic pulmonary rehabilitation class/lecture/course included in your program curriculum?

   □ Yes □ No

3. As a student have you assisted in a pulmonary rehabilitation program? ☐ Yes ☐No

   If yes, how many hours per day have you participated? _____

If not, do you have a preference for attending a pulmonary rehabilitation program? ☐ Yes ☐No

4. Are you familiar with Chronic Obstructive Pulmonary Disease (COPD)?

   □ Yes □ No

5. In your didactic and practical training in the pulmonary rehabilitation program, what diseases have you routinely seen? (You may check more than one)

   □ Chronic obstructive pulmonary disease (COPD)
   □ Asthma
   □ Cystic fibrosis
   □ Lung cancer
   □ Bronchiectasis
   □ Pulmonary hypertension
   □ Lung transplant
   □ Congestive heart failure
   □ Others, please specify _____

Section III. Students' perceptions of the factors that affect COPD patients from attending PR programs. Please check (√) according to your opinion. There are five options to mark; SD= strongly disagree, D= disagree, N= neutral, A= agree, SA= strongly agree.

Based on your experience and education, what factors may prevent COPD patients from attending PR programs?

No.	Statement	SD	D	N	A	SA
1	Mobility affected by breathlessness					
2	Low exercise tolerance					
3	Patients' education and disease management					
4	Patient fatigue related to disease					
5	Patient depression related to disease					
6	Availability of pulmonary rehabilitation PR programs					
7	Lack of experienced staff who can manage COPD patients in PR program					
8	Patients CO-morbidities					
9	Transportation problems					

10	Treatment cost					
11	The patient has doubts that PR is worthwhile					
12	Time commitment at the PR program					

Section IV. Students' perceptions toward pulmonary rehabilitation among COPD patients

Please check (√) according to your opinion. There are five options to mark; SD= strongly disagree, D= disagree, N= neutral, A= agree, SA= strongly agree.

No.	Statement	SD	D	N	A	SA
1	It is important for me to understand COPD and COPD management in my degree program					
2	It is important for me to recognize common signs and symptoms of COPD as a healthcare student.					
3	I can see the potential value of a pulmonary rehabilitation (PR) program for COPD patients					
4	I believe PR will improve exercise capacity in COPD patients					
5	I believe PR would reduce dyspnea and fatigue in COPD patients					
6	I believe PR will improve anxiety and depression in COPD patients					
7	I believe PR will improve health-related quality of life in COPD patients					
8	I believe PR will reduce the risk of future COPD exacerbation					
9	I believe PR will reduce hospital readmission in COPD patients					
10	I believe PR will improve nutritional status of COPD patients					
11	I believe PR will improve disease self-management in COPD patients					
12	Attendance at PR programs should be part of my clinical practice so that healthcare students are aware of the effectiveness of PR					
13	PR education sessions should be included in my program to ensure that healthcare students are aware of how effective PR is					
14	Smoking cessation should be a component of PR programs					
15	Psychological support should be a component of PR programs					
16	Nutritional counseling should be a component of PR programs					

Thank you for your participation

Appendix B: IRB Approval

INSTITUTIONAL REVIEW BOARD

Mail: P.O. Box 3999
Atlanta, Georgia 30302-3999
Phone: 404/413-3500

In Person: 3rd Floor
58 Edgewood
FWA: 00000129

January 06, 2023

Principal Investigator: Douglas Gardenhire

Key Personnel: Assiry, Amani M; Gardenhire, Douglas

Study Department: Georgia State University, Respiratory Therapy

Study Title: Perceptions of healthcare students toward pulmonary rehabilitation programs for COPD patients

Submission Type: Exempt Protocol Category 2

IRB Number: H23326

Reference Number: 373118

Determination Date: 01/05/2023

Status Check Due By: 01/04/2026

The above-referenced study has been determined by the Institutional Review Board (IRB) to be exempt from federal regulations as defined in 45 CFR 46 and has evaluated for the following:

1. Determination that it falls within one or more of the eight exempt categories allowed by the institution; and
2. Determination that the research meets the organization's ethical standards

If there is a change to your study, you should notify the IRB through an Amendment Application before the change is implemented. The IRB will determine whether your research continues to qualify for exemption or if a new submission of an expedited or full board application is required.

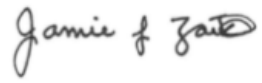
A Status Check must be submitted three years from the determination date indicated above. When the study is complete, a Study Closure Form must be submitted to the IRB.

This determination applies only to research activities engaged in by the personnel listed on this document.

It is the Principal Investigator's responsibility to ensure that the IRB's requirements as detailed in the Institutional Review Board Policies and Procedures For Faculty, Staff, and Student Researchers (available at gsu.edu/irb) are observed, and to ensure that relevant laws and regulations of any jurisdiction where the research takes place are observed in its conduct.

Any unanticipated problems resulting from this study must be reported immediately to the University Institutional Review Board. For more information, please visit our website at www.gsu.edu/irb.

Sincerely,



Jamie Zaikov, IRB Member

Appendix C: Cover Letter and Consent

Georgia State University

Department of Respiratory Therapy

Informed Consent

Title: Perceptions of healthcare students toward pulmonary rehabilitation programs for COPD patients.

Principal Investigator: Douglas S. Gardenhire, EdD, RRT-NPS, FAARC

Student Principal Investigator: Amani Assiry, BSc, RT

Dear Healthcare Students,

You are invited to take part in a research study because you are an undergraduate or graduate healthcare student. The purpose of this study is to evaluate the perceptions of healthcare students toward pulmonary rehabilitation programs for COPD patients.

The research is being conducted by Amani Assiry, a master's student at Georgia State University, under the direction of Dr. Douglas S. Gardenhire, Chairman of the Respiratory Therapy Department at GSU. You will receive no direct benefit from participating in this study, but the information gained will be helpful to evaluate and assess the perceptions of healthcare students toward pulmonary rehabilitation programs. If you are willing to participate in this study, you will be asked to complete the following survey. The survey should take approximately 10 minutes or less to complete.

Please note that your responses will be used for research purposes only and will be strictly confidential. To protect your confidentiality, no names or codes will be used to identify you or your survey. All surveys will be shredded after they have been analyzed. There is no compensation or known risk associated with participation. We don’t foresee this study causing you any harm or discomfort. You do not have to be in this study. You may skip questions or stop

participating at any time. We hope that you will submit a completed survey. However, if you choose not to participate in this study, you may withdraw at any time by not completing or submitting a blank survey.

If you have any questions about the research, please contact Amani Assiry at aassiry1@student.gsu.edu or Dr. Douglas S. Gardenhire, at dgardenhire@gsu.edu. The department's contact information can be found at the bottom of this page. If you are 19 years of age or older and agree to the above, please proceed to the survey. When finished, please place your survey in the designated envelope in the room.

Thank you in advance for your cooperation

Sincerely,

Amani Assiry

Department of Respiratory Care Georgia State University

P.O. Box 4019

Atlanta, GA 30302

(404) 413-1225