Original article

Effectiveness of a multidisciplinary pulmonary rehabilitation program at Ewha Womans University Mokdong Hospital, Korea

Running head: Multidisciplinary pulmonary rehabilitation program

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Abstract

Objectives: This study aimed to evaluate the effectiveness of a multidisciplinary pulmonary rehabilitation program at Ewha Womans University Mokdong Hospital, Korea that was designed to augment respiratory function, promote patient recovery, and improve discharge outcomes.

Methods: This study was conducted as part of quality improvement activities from March to August 2023. A multidisciplinary pulmonary rehabilitation team was established, comprising specialists in rehabilitation medicine, pulmonology, and thoracic surgery, as well as physical and occupational therapists, and the nutrition team. We developed a comprehensive rehabilitation program that included stretching, strengthening exercises, aerobic training, and respiratory retraining, supplemented by individualized

treatments such as bedside and ambulatory physical therapy. Evaluations before and after rehabilitation were performed using the Modified Medical Research Council Dyspnea Scale and the Chronic Obstructive Pulmonary Disease Assessment Test. The primary indicators of success were an increase of over 10% in pulmonary rehabilitation consultations and an improvement in discharge-to-home rates.

Results: The total number of pulmonary rehabilitation cases rose by 79.16%, from 24 to 43, while consultations saw a 21.15% increase, from 52 to 63. Of the 63 pulmonary rehabilitation cases, 32 (50.8%) were transferred to other hospitals, 25 (39.7%) were discharged home, and 6 (9.5%) remained hospitalized.

Conclusion: The study demonstrated the effectiveness of a multidisciplinary pulmonary rehabilitation approach in improving program participation and achieving meaningful discharge outcomes. These findings underscore the potential for expanding multidisciplinary efforts and highlight the need for further studies to increase discharge-to-home rates and evaluate the long-term impacts of such programs.

Keywords: Occupational therapists; Physical therapists; Physical therapy modalities; Pulmonary medicine; Quality improvement

Introduction

Background

Pulmonary rehabilitation is a critical therapeutic and rehabilitative process aimed at improving and maintaining respiratory function. It encompasses a comprehensive and intensive treatment approach that includes education, various techniques, and devices to alleviate and manage symptoms of respiratory diseases, as well as to help prevent complications associated with these disorders. Pulmonary rehabilitation enhances respiratory function, strengthens respiratory muscles, and improves breathing techniques, ultimately optimizing oxygen delivery. The goal of pulmonary rehabilitation is to enhance patients' physical capacity and psychological stability, enabling them to achieve optimal functional

performance in their daily lives.

Pulmonary rehabilitation is particularly crucial for patients with diminished respiratory capacity, including those suffering from chronic obstructive pulmonary disease (COPD), restrictive lung disease, tuberculosis-related lung conditions, or pulmonary arterial hypertension. It is equally crucial for patients recovering from lung cancer surgery, lung volume reduction surgery, or thoracic surgery, as well as for those in intensive care units. Although pulmonary rehabilitation has been proven effective in treating various respiratory diseases, its application in clinical practice is still not widespread [1-3]. Research on the current state and development of pulmonary rehabilitation in clinical settings has been conducted in several countries, including the United States. However, in Korea, such research is scarce, primarily due to a lack of awareness about the program (4-9). A 2011 study revealed that only 20.9% of institutions in Korea offered pulmonary rehabilitation (9). However, since 2017, when the National Health Insurance Service (NHIS) began covering pulmonary rehabilitation, there has been an increase in its institutional implementation (10). Despite this progress, the practice is mainly carried out by departments of internal medicine or rehabilitation medicine, without a comprehensive, multidisciplinary approach. At the tertiary university hospital where this study was conducted, there were only 26 multidisciplinary pulmonary rehabilitation consultations in the six months prior to the study, from March to August 2022.

Objectives

The aim of this study was to evaluate the effectiveness of a pulmonary rehabilitation program, which involves a multidisciplinary team comprising individuals from the departments of rehabilitation medicine, respiratory medicine, thoracic surgery, and the nutrition team.

Methods

Ethics statement

This study evaluates a new program in the Department of Rehabilitation at Ewha Medical University

Mokdong Hospital. Only the number of patients was counted from the electronic medical records; therefore, neither approval by the institutional review board nor informed consent was required.

Study design

This was a case series analysis.

Setting

This study was carried out as part of the 2023 Quality Improvement (QI) activities at Ewha Womans University Mokdong Hospital. It targeted inpatients at the hospital from March to August 2023.

Subjects were patients who participated in the pulmonary rehabilitation program from March to August 2023.

Interventions

Multidisciplinary pulmonary rehabilitation program

To establish a multidisciplinary pulmonary rehabilitation program, a dedicated team was formed that included physicians from the Departments of Rehabilitation Medicine, Pulmonology, and Thoracic Surgery, along with physical therapists, occupational therapists, and nutritionists. Efforts to promote this team were implemented throughout the hospital to enhance awareness of the multidisciplinary approach to pulmonary rehabilitation. As part of these promotional efforts, the program was highlighted as the theme for the hospital's 2023 QI activities. Information about the program was disseminated within the hospital to increase visibility. Additionally, networking opportunities and collaborative meetings were organized to foster stronger cooperation among the medical staff from the departments of pulmonology, rehabilitation medicine, and thoracic surgery.

Furthermore, a comprehensive respiratory rehabilitation program was developed, incorporating various components including stretching, strengthening exercises, aerobic exercise, respiratory retraining, and

equipment-based training. Rehabilitation treatments were tailored to each patient's condition, offering diverse approaches such as bedside pulmonary physical therapy and ambulatory physical therapy. Additionally, regular multidisciplinary patient meetings and follow-up consultations were conducted.

An evaluation protocol for pre- and post-rehabilitation therapy was established. Specifically, the protocol was enhanced by including not only the conventional manual muscle test but also the Modified Medical Research Council (mMRC) Dyspnea Scale and the Chronic Obstructive Pulmonary Disease Assessment Test (CAT). This enhancement facilitated a more comprehensive evaluation and treatment of respiratory conditions.

Outcomes

The key indicators for this QI activity were defined as an increase of more than 10% in the number of pulmonary rehabilitation consultations compared to the same period in the previous year, and an enhancement in the discharge-to-home rate.

Data sources/measurement

Data were obtained from the electronic medical records of pulmonary rehabilitation cases before and after the introduction of the multidisciplinary pulmonary rehabilitation program. The patient count was recorded.

Bias Bias was not considered reportable because the findings were derived from electronic medical records before and after the intervention.

Study size

All patients were included during the observational period; no sample size estimation was conducted.

Statistical methods

A descriptive analysis was conducted to compare the total number of pulmonary rehabilitation cases before and after the intervention.

Results

As a result of this QI activity, the total number of pulmonary rehabilitation cases increased by 79.16%, from 24 to 43 cases, and the number of pulmonary rehabilitation consultations rose by 21.15%, from 52 to 63 cases (Fig. 1). Of the 63 pulmonary rehabilitation cases, 32 (50.8%) were transferred to other hospitals, 25 (39.7%) were discharged home, and 6 (9.5%) remained hospitalized.

Discussion

Key results

The number of pulmonary rehabilitation consultations exceeded the target of a 10% increase, reaching a 21.15% increase and thereby achieving the goal.

Interpretation/comparison with previous studies

There was a significant increase of over 20% compared to 2022, a year that already had a high number of respiratory-related inpatient cases due to COVID-19. Additionally, this initiative provided an opportunity to enhance awareness of the importance of pulmonary rehabilitation among other healthcare professionals in the hospital, who previously had limited understanding of its significance.

As of 2019, approximately 6,200 people in Korea died annually from chronic lower respiratory diseases, which accounted for 2.1% of all deaths (11). The mortality rate for these diseases was 12.0 per 100,000 population, ranking them 9th among causes of death (11). According to the World Health Organization (WHO), chronic diseases are responsible for 71% of deaths globally, with chronic respiratory diseases contributing to 5% of the total. This indicates that chronic respiratory diseases account for 7% of deaths

attributable to chronic diseases worldwide (12). The prevalence and mortality rates of respiratory diseases are on the rise. Pulmonary rehabilitation is crucial in managing chronic lung diseases and offers significant benefits. These include reducing exercise intolerance, improving health-related quality of life, and alleviating dyspnea. It is recognized as a highly effective therapeutic approach for enhancing the overall well-being of patients with respiratory conditions (13). A 2011 study in Korea found that only 20.9% of 43 tertiary and general hospitals offered pulmonary rehabilitation (9). When implemented, most programs focused primarily on respiratory education, and it was very rare for them to include the high-intensity pulmonary rehabilitation programs recommended by guidelines (10). However, pulmonary rehabilitation should encompass more than just respiratory education. It should also include exercise training, behavioral modifications, and education aimed at improving both the physical and psychological conditions of patients with chronic respiratory diseases.

According to the "Evaluation of the Effects and Improvement Plans for the Phase 2 Pilot Program of Rehabilitation Medical Institution Fees" conducted by the Health Insurance Review and Assessment Service (HIRA) in 2022, the discharge-to-home rates were 66.1% for moderate patients, 39.8% for severe patients, and 13.4% for very severe patients (14). This study also included patients from the intensive care unit, which likely influenced the overall discharge-to-home rate, estimated at 39.7%.

Limitations

First, the duration of the study was limited to only six months, which hindered a clear evaluation of its long-term effects. Future research should extend over a longer period, ideally on an annual basis. Second, there is a growing trend in international studies toward outpatient or home-based pulmonary rehabilitation. Consequently, future studies should concentrate on enhancing the quality of home-based pulmonary rehabilitation for outpatient patients. Third, the study did not evaluate quality of life, depression, or anxiety, focusing solely on mMRC and CAT scores. Additional research in these areas would be valuable.

Conclusion

This study demonstrated a 79.16% increase in total pulmonary rehabilitation cases, rising from 24 to 43, and a 21.15% increase in consultations, from 52 to 63, surpassing the target of a 10% improvement. However, the discharge-to-home rate was 39.7%, which was lower than the 50.8% transfer-to-other-hospitals rate. This indicates that while the multidisciplinary pulmonary rehabilitation approach effectively increased participation, further efforts are necessary to improve discharge-to-home outcomes. The significance of this study lies in its implementation of a comprehensive, multidisciplinary approach to pulmonary rehabilitation. Future interventions should focus on early rehabilitation and targeted strategies to facilitate transitions back to home environments, which could potentially improve these outcomes.

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Writing - original draft: Suh JH

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Conflict of interest

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Figure legends.

Figure 1. The number of pulmonary rehabilitation consultations and the number of bedside and ambulatory pulmonary rehabilitation cases