

The Reasons for Non-Adherence in Pulmonary Rehabilitation Programs

İpek Candemir, Dicle Kaymaz, Pınar Ergün

Pulmonary Rehabilitation Center, Ankara Atatürk Chest Diseases and Surgery Training and Research Hospital, Ankara, Turkey

Abstract

Objective: Pulmonary Rehabilitation (PR), a multidisciplinary treatment modality, is recommended in management of COPD. Structure, experience of units /centers, contents of the program are as important as patient-specific factors. To our knowledge, there is no data regarding the success of PR in Turkey. This study was performed in order to determine the reasons for nonadherence in patients who underwent PR programs in Turkey.

Methods: Demographic data, initial assessment parameters of 143 patients were collected retrospectively, examined. Age, smoking history, FEV₁%, health related quality of life, dyspnea score, body composition and psychological status of all patients who were divided into two group according to completion of PR were compared. The reasons of non-completion were asked from patients who did not complete PR by phone, their answers were recorded.

Results: Thirty two patients did not complete (22.3%) multidisciplinary, comprehensive, an individualized outpatient PR program. The most common reason for non-adherence except all medical conditions including exacerbations was inability to comprehend efficacy and contents of PR program. While mean walking distance of patients who completed PR was 241±128.9, other group's distance was 183.4±119.9 m, endurance time was 7.03±6.32, 4.89±5.3 min (respectively, p=0.02). Although total SGRQ and all domains' scores of patients who did not complete PR were higher, only impact domain scores, MRC scores were significantly higher (p=0.045, 0.01 respectively). Body composition, psychosocial status of patients did not differ significantly.

Conclusion: Patients with advanced dyspnea, decreased exercise capacity should be continuously, vigorously informed of possible gains in order to increase success rate of programs, adherence to programs should be reinforced by patient-specific individualized PR programs.

Keywords: Dyspnea, patients nonadherence, pulmonary rehabilitation



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Corresponding Author

İpek Candemir

E-mail: ipekayli@yahoo.com

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INTRODUCTION

Pulmonary rehabilitation (PR) is a comprehensive treatment modality that includes approaches to improve the physical and emotional states of chronic respiratory patients and provide sustaining health-promoting behaviors. It includes individualized exercise training after assessing patients and approaches, such as the training of patients and their families, for the development of behavior modification. PR reportedly reduces symptoms, increases exercise capacity, and enhances health-related quality of life, particularly in chronic obstructive pulmonary disease (COPD) as well as other chronic respiratory diseases (1). PR is a cost-effective treatment modality that also reduces the number of attacks and hospital admissions for COPD (2). Although it is supported by highly effective scientific evidence, the rate of attending PR is reported to be approximately 50% and that of not attending it is reported to vary from 23% to 31% (3-5). Based on the existing literature, transportation, working conditions, concerns regarding the benefits of PR, depressive symptoms, active cigarette use, level of shortness of breath, feelings of inadequacy, lack of family support, and inadequate information obtained from the referral doctor are reported to be the causes underlying this maladaptation to PR (5-7).

In addition to factors such as the team structure of units or centers, experience, and program content, which can be detrimental to the success of PR, factors related to the patient may be involved. No data on the success of PR is available in Turkey. The reasons for not attending PR were investigated in this study in order to contribute to the existing literature pertaining to this aspect in our country.

METHODS

Between 2007 and 2009, 143 patients with chronic respiratory problems who applied to our PR center were retrospectively evaluated. Age, sex, smoking history, forced expiratory volume in 1 sec (FEV₁) % values, and the assessment parameters before PR were examined in all cases. Dyspnea perception was measured using the Medical Research Council (MRC) dyspnea scale (8), exercise capacity using the incremental shuttle walking test (ISWT) and endurance shuttle walking test (ESWT) (9), health-related quality of life using the St. George's Respiratory Questionnaire (SGRQ) (10), body composition using the bioelectrical impedance method, and psychosocial status using the Hospital Anxiety Depression Scale. The patients not attending the PR program were called and asked open-ended questions pertaining to the reasons for not attending it, and the answers were recorded. All patients provided written informed consents before the parameters were recorded.

Incremental shuttle walking test was performed based on the principle that the patient walks on a shuttle-shaped 10-m platform from one end to the other at an increasing speed. In this test, the walking speed is increased every minute (0.17 m/s) and is controlled by 12 levels of audible signals. The test was terminated when the patient was too breathless to maintain the required speed or failed to complete a shuttle in the time allowed, i.e., when the audio signal sounded. ESWT is a fixed-load test based on the principle of using the same 10-m platform and signals after completing ISWT. The workload or walking speed in ESWT was calculated based on the percentage of maximal performance determined in ISWT for each patient [9].

Body mass index (BMI) (kg/m²) was calculated by dividing the weight (kg) of the patient by the square of the height in meters (m²). Fat-free body mass (FFBM) was measured using the bioelectrical impedance method (Tanita device) (BIA model TBF-300; Tanita Corporation, Tokyo, Japan). Fat-free body mass index (FFBMI) was calculated by dividing the FFBM (kg) by the square of the height in meters (m²).

A multidisciplinary team structure that comprised a chest diseases specialist (physician responsible for the program), a physiotherapist, a dietitian, a psychologist, and the nursing staff was used. The program structure was personal and comprehensive.

The PR program was implemented for at least 8 weeks at 3 days per week: 2 days per week at the PR center under direct supervision and 1 day at home without supervision. The program content included aerobic and strengthening exercises for upper and lower extremities, methods of coping with shortness of breath, nutritional and psychosocial support therapy in necessary cases, and education of patients and their relatives.

Statistical Analysis

Statistical Package for the Social Sciences (version 10) (Chicago, IL, USA) was used for the statistical analysis. The Shapiro–Wilks test was

used to determine whether the data was normally distributed. In between-group comparisons, two independent sample t-tests were used as the statistical method for the normally distributed data and the Mann–Whitney U test was used for the non-normally distributed data. Chi-square independence tests were used to examine the relationship between groups and determine whether the variables were independent. A p-value of <0.05 was considered significant.

RESULTS

Thirty-one of the 140 patients (21.6%) were female, with the mean age of 59±12 years. Of the cases, 113 (79%) had COPD and the remaining had chronic respiratory problems such as asthma, bronchiectasis, kyphoscoliosis, and interstitial lung disease. Because the total number of diagnosed cases could not be found in the records, it has not been provided. It was observed that 32 (22.3%) of the cases did not continue PR. The general demographic characteristics of the cases that continued and did not continue PR are given in Table 1.

Besides the medical causes, including attacks, the most common reason for not attending the PR program in eight cases (25%) was the lack of knowledge on its content and benefit. Economic problems (five cases, 15.6%) and increased sensation of shortness of breath (four cases, 12.5%) were the other most common causes. The lack of understanding of the PR content, which was the most common reason, was respecified with the second and third reasons in two cases. According to the frequency, the other causes were workplace problems, smoking, acute exacerbation, and medical causes other than

Table 1. Demographic characteristics of the patients

	Those attending PR	Those not attending PR	p
Sex (male/female)	88 (79.3%) / 23 (20.7%)	24 (75%) / 8 (25%)	0.121
Age (years)	59.2±13.3	59.9±10.5	0.324
COPD	87 (73%)	26 (74%)	0.451

COPD: Chronic obstructive pulmonary disease; PR: pulmonary rehabilitation

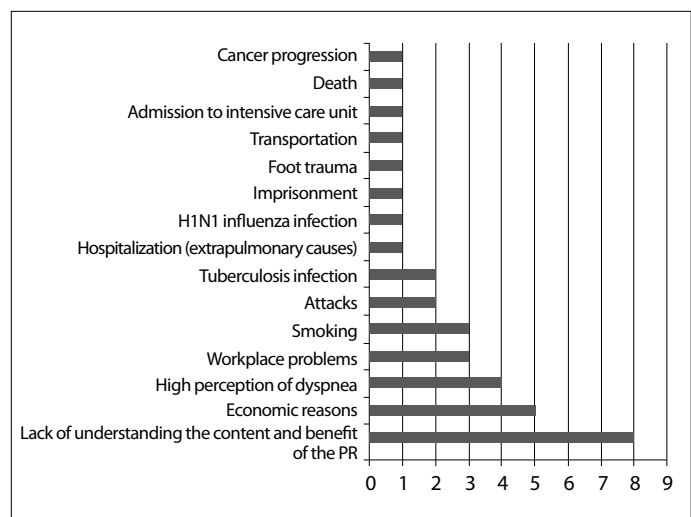
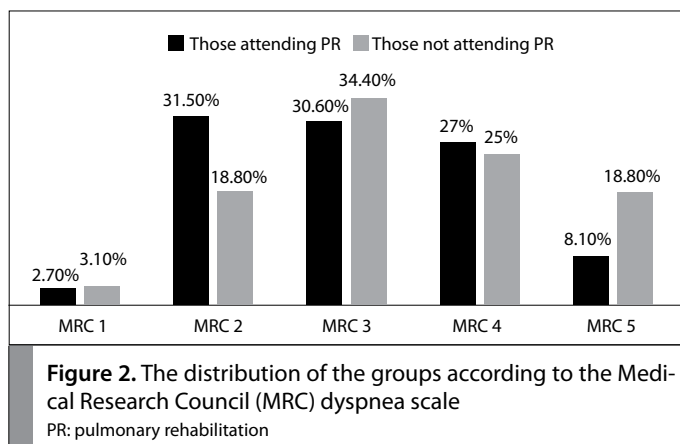


Figure 1. Reasons for not attending the pulmonary rehabilitation PR: pulmonary rehabilitation; X: causes; Y: number of patients (n)

Table 2. Descriptive statistics of the initial evaluation data of the patients attending and not attending the PR program and the between-group comparison

	Those attending the PR	Those not attending PR	p
N	111	32	
Smoking history (pack-years)	34.4±28.8	49±36.8	0.074
FEV ₁ %	39.7±18.1	37±16	0.213
ISWT (m)	241±128.9	183.4±119.9	0.024
ESWT (min)	7.03±6.32	4.89±5.36	0.027
- Symptom	64.1±16.8	70±14.1	0.321
- Activity	74±19.9	78.3±17.6	0.170
- Being influenced	54.1±21.2	62.7±19.9	0.045
- Total	61.9±17.7	68.8±15.7	0.091
Anxiety	13 (11.7%)	6 (18.8%)	0.445
Depression	14 (12.6%)	9 (21.8%)	0.323
BMI (kg/m ²)	24.1±5.8	25.8±6.6	0.087
FFBMI (kg/m ²)	18.1±2.4	18.7±2.6	0.065
MRC	3.0±1.2	3.4±1.6	0.012

BMI: Body mass index; ESWT: endurance shuttle walking test; FEV₁: forced expiratory volume in 1 sec; FFBMI: fat-free body mass index; ISWT: incremental shuttle walking test; MRC: Medical Research Council dyspnea scale; PR: pulmonary rehabilitation; SGRQ: St. George's Respiratory Questionnaire



episodes. When all the medical causes, including episodes, were evaluated together, they were found to be the most common cause in 10 cases (31.2%) (Figure 1).

There was no statistically significant difference among the BMI, FFBMI, and HAD scores in the two groups that primarily comprised males with similar ages and FEV₁ % averages (Table 2). Although a longer smoking history in terms of pack-years in the group that did not continue PR was observed, there was no statistically significant difference ($p=0.074$). Furthermore, although the walking distance was 241±128.9 m in the group attending PR, it was 183.4±119.9 m in that not attending it. The endurance duration was found to be 7.03±6.32

min in the group attending PR and 4.89±5.36 min in that not attending it. There was a statistically significant difference between these two groups in terms of the exercise capacities ($p=0.02$). Although the SGRQ total and subheading scores were higher in the group not attending PR, a significant increase was observed in the group that did not continue PR only in the SGRQ subscale ($p=0.045$) (Table 2). In addition, the MRC scores of the group that did not continue PR were observed to be statistically significant unlike those of the group that continued it ($p=0.01$) (Figure 2).

DISCUSSION

In this study, the proportion of starting and not continuing PR was shown to be 22.3% among patients who applied to our center. Among the reasons for not attending PR, the most common reason was found to be the lack of understanding of the content and usefulness of the PR program (19%). The other most common causes were economic problems, increased sensation of shortness of breath, and acute exacerbation of the disease. In addition, patients who did not continue PR were found to have a high perception of dyspnea, a decreased exercise capacity, and an impaired quality of life at an advanced level.

The rates of starting and not continuing PR, which were between 23% and 31% in previous studies (4, 5), were below the lower limit in our study. One of the possible reasons for this was the multidisciplinary team structure and the program success at our center. Understanding the benefits of PR and the belief in this treatment were shown to be the most important factors in adapting to the PR program (12-14). In a compilation made in 2015, the lack of understanding the PR program and a low belief in cure were found to be some of the reasons of this maladaptation. In addition, a reason for not attending the program was that the patients were still symptomatic and they felt that their anticipations were not met after a few sessions (15).

Another important reason affecting the adaptation was transportation problems (3, 13, 16). In the National Emphysema Treatment Trial (NETT), those living close to the PR centers were found to show higher attendance in the programs (17). When the causes underlying transportation problems were examined, economic reasons were found to be detrimental in addition to limitation in movement due to the disease (18, 19). Similarly, transportation and economic problems were identified in this study as important reasons preventing attendance in the program. The third most common cause was the increased sensation of shortness of breath. Although the rates of attending PR in patients with MRC 3 and 4 were similar, the rates of not attending it in patients with MRC 5 were high. In this group, in addition to a high perception of dyspnea, exercise capacities were found to be low. Although the program structures were personal, it is believed that transportation problems, the lack of belief in cure, and low expectations pertaining to health conditions are considered to play a role in not attending the program. Only a poor functional status and pulmonary functions have been demonstrated as causes underlying non-attendance in two separate studies; this is consistent with our results (20, 21). The patients with an estimated FEV₁ of ≥20% in NETT were observed to have completed the PR program at a significantly higher rate. Long-term oxygen use, lung function (FEV₁), exercise capacity (ISWT), and quality of life (Chronic Respiratory Disease Questionnaire) have been found to be associated with not attending the program in a study comprising 711 COPD patients

(22). In this study, it was seen that the quality of life of the patients who did not attend the program was deteriorated, with a decreased exercise capacity.

In the study conducted by Heerema-Poelman et al. (23) in 2013, 70 COPD patients who completed the multidisciplinary personal PR program were included only in the exercise training program for 1 year at home under the supervision of a physiotherapist. They reported that 36.7% of these patients did not attend the program primarily owing to episodes. Low respiratory function tests, short onset assessment, and depressive symptoms were predictors of not attending PR, but they were not considered as an attack predictor. The authors emphasized that the attacks were based on patient declaration rather than expert diagnosis (23). In this study, attacks were among the common causes. In another study that comprised COPD patients diagnosed in 2013, the rate of not attending the program was 29.1%, with the most common cause underlying non-attendance being attacks (22%) and other medical causes (20%) (22). When evaluated with our study, all medical reasons, including attacks, were found to be the most common reason for not attending the program (31.2%).

There are different conclusions pertaining to the effect of psychosocial situations of the patients on attending PR programs. Although a meta-analysis has shown that the psychosocial status has an effect on the attendance (3), a large-scale study did not find that this status was associated with the attendance (24). In this study, the anxiety and depression scores of the patients completing the PR program were higher, and there was no statistically significant difference between the two groups. Smoking was also an important factor affecting the adaptation and attendance in PR programs (3, 4, 17, 21, 25). In this study, patients reported that active cigarette use was a reason for not attending the programs (6%). When smoking histories were examined, there was no statistically significant difference between the attending and non-attending groups in terms of pack-years. Although the smoking history was found to be a significant cause of maladaptation in a study comprising COPD patients, which was consistent with this study, there was no relationship between pack-years and not attending the program (22).

The limitations of this study are the number of people using oxygen for a long time and the loss of data because the patients who, in advance, rejected to participate in the program were not recorded owing to the study being retrospective.

CONCLUSION

Despite proven positive effects, non-attendance in PR programs was observed. One of the most important reasons for patient maladaptation to an outpatient PR program is the lack of understanding of the program content and its necessity in addition to the optimization of medical treatment. In order to increase the program's success, possible gains should be repeatedly explained and program adaptation should be supported by personalized PR programs, especially for patients with advanced dyspnea and a decreased exercise capacity. If transportation is a decisive factor in adaptation, different PR implementation models should be introduced.

Ethics Committee Approval: Ethics committee approval was not received for this study. Because the study was retrospective observational, not experimental.

Informed Consent: The data of patients who completed the multidisciplinary PR program were recorded after their consent had been taken.

Peer-review: Externally peer-reviewed.

Conflict of Interest: No conflict of interest was declared by the authors.

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