TUGAS AKHIR MODUL KARDIOPULMONAL
KESIMPULAN JURNAL KARDIOPULMONAL

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KESIMPULAN JURNAL KARDIOPULMONAL

TOPIK GANGGUAN PLEURA (EFUSI PLEURA)

Efusi pleura merupakan keadaan dimana terjadi akumulasi cairan serosa di antara pleura parietal dan pleura visceral, tepatnya di dalam rongga pleura. Efusi pleura paling umum disebabkan oleh penyakit jantung atau paru-paru dan peradangan atau infeksi pada pleura. Dimana efusi pleura dapat menyebabkan terjadinya penurunan ekspansi thorax dan menyebabkan atelektasis paru yang diakibatkan adanya keterbatasan kapasitas thorax dan kelebihan cairan pada paru-paru.

Salah satu intervensi fisioterapi yang dapat diberikan yaitu latihan pernapasan. Latihan pernapasan dilakukan untuk mengembangkan paru-paru dan meningkatkan oksigenasi dan volume paru-paru pada pasien dengan efusi pleura. Latihan pernapasan yang diberikan dapat berupa deep breathing atau segmental breathing. Dosis pemberian latihan yaitu 1 kali sehari, dengan durasi 10-15 menit. Latihan pernapasan dilakukan dengan cara melakukan 6 kali nafas/menit dan berikan waktu jeda sejenak setiap 6 kali nafas.

Berdasarkan hasil penelitian, latihan pernapasan dengan segmental breathing memiliki efek yang lebih baik dibandingkan deep breathing terhadap peningkatan ekspansi thorax dan fungsi paru. Mekanisme fisiologis yang mendasari peningkatan lebih banyak ekspansi dada pada kelompok pernapasan segmental mungkin disebabkan oleh latihan ini yang seharusnya bekerja pada mekanisme refleks regangan. Peregangan cepat pada interkostal eksternal mengarah pada fasilitasi kontraksi mereka yang membantu inspirasi yang mengarah pada ekspansi dada dan peningkatan ekspansi paru-paru lebih lanjut. Ini membantu dalam meningkatkan kapasitas inspirasi dan selama ekspirasi, membantu ekspirasi penuh di sana dengan membantu pasien untuk rileks dengan nyaman.

KESIMPULAN JURNAL KARDIOPULMONAL

TOPIK PENYAKIT PARU OBSTRUKTIF KRONIK (PPOK)

Penyakit paru obstruktif kronik (PPOK) merupakan penyakit yang mempengaruhi sistem bronkopulmonalis. Dimana PPOK memerlukan tindakan fisioterapi berupa rehabilitasi yang dapat membantu untuk meningkatkan daya tahan pasien terhadap latihan, mobilitas dalam aktivitas sehari-hari, mengurangi sesak nafas, dan juga meningkatkan kualitas hidup.

Program rehabilitasi yang dapat diberikan kepada pasien PPOK berupa latihan aerobic dengan intensitas rendah (walking, slow running, cycling), hiking, equilibrium exercises, resistance exercises, callisthenic exercises, latihan pernapasan (diafragma breathing, pernapasan melalui hidung dan mulut saat istirahat dan selama latihan) untuk mengurangi bronkokonstriksi dan dyspnea, forced exhalation exercises, coughing, buang napas dengan mengucapkan suku kata, latihan untuk menghirup napas dalam waktu lama dan buang napas dalam waktu singkat, dikombinasikan dengan latihan gymnastic untuk otot dada, perut, dan punggung. Program rehabilitasi akan dievaluasi menggunakan 6MWT, borg scale, dan mMRC scale.

KESIMPULAN JURNAL KARDIOPULMONAL
TOPIK TUBERCULOSIS PARU (TB PARU)

Pasien tuberculosis paru (TB paru) sering mengalami gangguan fungsi paru yang diakibatkan adanya perubahan anatomi akibat penyakit yang dideritanya. Fisioterapi berperan penting dalam program rehabilitasi terhadap pasien TB paru dengan tujuan membantu meningkatkan fungsi paru, daya tahan terhadap latihan, dan kualitas hidup pasien.

Selain pemberian intervensi secara langsung di klinik, fisioterapi juga dapat memberikan home program rehabilitasi untuk membantu pasien tetap dapat melakukan rehabilitasi secara mandiri atau dibantu oleh keluarga sehingga dapat mempercepat tercapainya tujuan yang diinginkan. Home program rehabilitasi yang diberikan mencakup latihan kardio intensitas rendah seperti ROM exercise AGA-AGB, wall push-up, duduk ke berdiri, calf raises, dan berjalan. Selain itu, program rehabilitasi juga meliputi pursed lip breathing, diafragma breathing, koreksi postur tubuh, dan coughing.

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Original Research Article

Effectiveness of Deep Breathing versus Segmental Breathing Exercises on Chest Expansion in Pleural Effusion

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ABSTRACT

Background: It is estimated that close to 90 % of diseases affecting the respiratory system involve the pleura and approximately 1.5 million patients are diagnosed with pleural effusion each year in the United States. Tuberculosis (TB) is a common cause of pleural effusion in India. Pleural effusion causes reduction of chest expansion it leads to lung atelectasis and excess fluid causes the lungs to collapse.
Purpose: The purpose of this study was to find out the effectiveness of deep breathing versus segmental breathing exercises on chest expansion and pulmonary function (FEV1, FVC IC) in individuals with pleural effusion.
Methods: The prospective comparative study consists of thirty participants between the ages of 30 to 40 years with the clinical diagnosis of unilateral pleural effusion. The deep breathing group (group A) received deep breathing exercises and segmental breathing group (group B) received segmental breathing exercises for two weeks of duration.
Results: The results of the study showed that there was a significant difference between both the groups on chest expansion ($p<0.05$), FEV_1 ($p<0.05$), FVC ($p<0.05$), IC ($p<0.05$) between both the groups.
Conclusion: Study concludes that the segmental breathing exercises have better effect on chest expansion and pulmonary function than deep breathing exercises in pleural effusion.

Keywords: Pleural Effusion, Deep Breathing, Segmental Breathing, Chest Expansion, Pulmonary Function.

INTRODUCTION

Pleural effusion, commonly known as "water in the lungs" is a usually diagnosed condition among restrictive diseases. It is defined as excessive accumulation of serous fluid between parietal pleura and visceral pleura (i.e. within the pleural cavity). [1,2] The pleural space averages 10 to 20 mm in width and normally is filled with 10 to 20 ml of serous fluid. [3,4] Normally, small blood vessels in the pleural linings produce a small amount of fluid that lubricates the opposed pleural membranes so that they can glide smoothly against one another during breathing movements.

The most common causes are diseases of the heart or lungs, and inflammation or infection of the pleura. Pleural fluid accumulates, when pleural fluid formation exceeds pleural fluid absorption. Normally, pleural fluid enters the pleural space from the capillaries in the parietal pleura and also enters from interstitial spaces of lung through the visceral pleura or from the peritoneal cavity through small holes in the diaphragm. Pleural Effusion can result from increased pleural fluid formation in the lung interstitial, parietal pleura, peritoneal cavity, or from decreased pleural fluid removal by the pleural lymphatics. [7,8]

It is estimated that close to 30 % of diseases affecting the respiratory system involve the pleura. Approximately 1.5 million patients are diagnosed with pleural effusion each year in the United States. [9] Tuberculosis (TB) is a common cause of pleural effusion in India. [illegible]

The intrapleural pressure is the pressure existing in pleural cavity. Normal intrapleural pressure is -5cmH₂O; during inspiration chest wall expands, which allows the lung to expand and the air to flow inward. During expiration, the intrapleural pressure decreases to approximately -4 cmH₂O, allowing the air to flow from the lung to the atmosphere. [10,11] So because of negativity, it keeps the lungs expanded and prevents the collapsing tendency of lung produced by elastic recoiling of tissues. [12,13] however, if air or fluid of any kind is allowed to enter the pleural space; the negative pressure will be lost and it will be positive and the affected lung will partially or fully collapse. [14-17]

Medical management of pleural effusion includes aspiration of fluid may be necessary to relive dyspnea, insertion of chest tube, if rapid accumulation of fluid occurs and pleurodesis in malignant effusion. The best way to clear up a pleural effusion is to direct the treatment to what is causing it, rather than treating the effusion itself. The physiotherapy management consists of dyspnea relieving positions, Breathing exercises, thoracic expansion and inspiratory exercises with incentive spirometer. Deep breathing exercises are used to expand lungs fully and to improve oxygenation & lung volumes in patients with pleural effusion. [18-21] This exercise helps to maintain function of the lung and prevent lung collapse from lack of use and long-term build-up of fluids in the pleural cavities. Elizabeth W. et al conducted study on the immediate effects of deep breathing exercises after cardiac surgery which suggests it decreases the atelectatic area and increases ventilation. [24,25] Segmental breathing exercises are given to encourage or increase localized expansion of affected lung in pleural effusion patients. Hypoventilation does occur in certain areas of the lungs because of pain and muscle guarding after surgery, atelectasis and pleural effusion. Therefore, it is important to emphasize expansion of problems areas of the lungs and chest wall. The exercises are supposed to act on a variety of mechanisms, including the stretch reflex mechanism. Quick stretch on the external intercostal leads to facilitation of their contraction. [22-26]

Pleural effusion causes reduction of chest expansion and it leads to lung atelectasis, because the capacity of the thorax is limited and excess fluid causes the lungs to collapse. So, present study aims to find out the effectiveness of deep breathing versus segmental breathing exercises on chest expansion and pulmonary function in individuals with pleural effusion.

MATERIALS AND METHODS

The research design used for the study was prospective comparative study. The sample was 30 participants (22 Male and 8 Female) with pleural effusion were selected based on the inclusion and exclusion criteria. The intervention period was once in a day, 6 days per week for 2 weeks. Both groups were given 6 breaths per minute. [11,30] Total were 18-20 breaths of exercises in one session and each treatment session lasted for 10-15 minutes including test period. Both interventions were given once in a day (12 sessions) for 2 weeks.

The inclusion criteria for this study were both male and female participants, age between 20 to 40 years those willing to participate in this study, individuals with clinical diagnosis of unilateral pleural effusion with (intercostal drainage) ICDand decreased chest expansion.The exclusion criteria for the study were participants with unbearable chest pain, chylothorax, hemothorax, pneumothorax, participants with other pleural disorder and chest trauma & rib fracture.

Outcome Measures

Chest Expansion Measurement: Chest expansion is the difference between maximum inspiration and maximum expiration. Chest expansion was measured with thumb method at different level of the chest which measure symmetry and extent of expansion. It was performed at three levels, for three lobes of the lungs from top to bottom. This method is active for measuring chest expansion in unilateral lung disease. The levels of measurements are at sternal notch, at the xiphoid process, at the T8 vertebra.[23,24]

Pulmonary Function: Forced Expiratory Volume in One Second (FEV_1), Forced Vital Capacity (FVC) and Inspiratory Capacity (IC) This specific measurement computed by the instrument called spirometry (RMS HELIOS 401)

The study received approval from Institutional Ethical Committee of Pravara Institute of Medical Sciences.

Intervention:

Group A (Deep breathing Group): The participants in this group received deep breathing exercises with18-20 breaths in one session (6 breaths/min) with rest interval after every 6 breaths. Treatment session was lasted for 10-15 minutes.

Group B (Segmental breathing Group): The participants in this group received segmental breathing exercises with 18-20 breaths in one session (6 breaths/min) with rest interval after every 6 breaths. Treatment session was lasted for 10-15 minutes.

DATA ANALYSIS AND RESULTS

Statistical analysis was carried out utilizing the trial version of SPSS 17.0 and Graph Pad Prism 5.0 and $p<0.05$ is considered as level of significance. Student's Paired' test and Unpaired' test was applied to analyze the data.

Chest Expansion:

Chest expansion was measured at three levels in both the groups (Table 1).

At sternal notch, the mean difference of deep breathing group was 0.06±0.17 cm and in segmental breathing group it was 0.53±0.44cm.At xiphiod process, the mean difference of deep breathing group was 0.20±0.31 and in segmental breathing group it was 1.20±0.41cm. At T_8 vertebral level, the mean difference was 0.43±0.17 cm and in deep breathing group it was 1.00±0.47 cm.

Forced Expiratory Volume In One Second (FEV_1): In deep breathing group the difference between the pre and post values of FEV_1 was 0.24 Liters and 7.86 of % predicted. In segmental breathing group the difference between the pre and post values of FEV_1 was 0.83 Liters and 22.20 of % predicted (Table 2).

Forced vital capacity (FVC): In deep breathing group the difference between the pre and post values of FVC in deep breathing group was 0.34 Liters and 10.80 of % predicted. In segmental breathing group the difference between the pre and post values of was 0.79 Liters and 23.86 of % predicted (Table 2).

Inspiratory Capacity (IC): The difference between the pre and post values of IC in deep breathing group was 0.21±0.11 Liters. The difference between the pre and post values of IC in segmental breathing group was 0.58±0.10 (Table 2).

Table 1: Pre-Post Comparison of Chest Expansion at Sternal Notch of Both The Groups.

Levels of chest expansion	Group	Pre Test	Post Test	Mean Difference	t-value	p-value
At Sternal notch	Group A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Group B	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
At Xiphoid	Group A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Group B	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Group A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Group B	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 2: Pre-Post Comparison of PFT Parameters in Litres of Both the Groups.

PFT	Group	Pre Test	Post Test	Mean Difference	t-value	p-value
FEV₁	Group A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Group B	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Group A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FVC	Group B	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R	Group A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Group B	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

DISCUSSION

The result obtained in this study indicated that, there was significant increase in expansion and pulmonary function in both groups but there were significant differences between both the groups at the end of the study. It means that the result of segmental breathing group was more effective than the deep breathing group.

Chest Expansion:

There was significant improvement of chest expansion at middle and lower lobe of lung in deep breathing group and in segmental breathing group there was highly significant improvement in all the lobes of the lung, but more improvement was seen at middle and lower lobes.

The physiological mechanism underlying the more increase in chest expansion in segmental breathing group is probably due to this exercise which are supposed to act on the stretch reflex mechanism. Quick stretch on the external intercostal leads to facilitation of their contraction that assists in inspiration which leads to chest expansion and further lung expansion was increased. It helped in increasing inspiratory capacity and during expiration, it helped in full expiration there by helping the patient to relax comfortably.

As per this study these exercises demonstrate benefits in restrictive dysfunction, as they help in re-expansion of lungs to some extent. So it may help in early recovery and reducing the late complications as pleural fibrosis.

In the 1970's, unilateral breathing techniques by applying pressure with either a hand over one side in order to facilitate regional lung expansion were considered to be viable treatment options. Sarkar P. and Sharma H. (July 2010) conducted study on segmental breathing exercises in 40 empyema patients and they found that chest expansion was increased at all the levels. Moreover it was found that the increase at the 10th costal cartilage level was more than the other two levels, which could be probably because of restriction due to accumulation of pus. The middle lobe showed a better expansion than axillary level. There was comparatively lesser expansion at axillary level as this level had near to normal ranges of expansion in most of the cases, even prior to exercise application. Presents study states that segmental breathing exercises are better than deep breathing exercises to improve chest expansion in pleural effusion. Therefore, early initiation of segmental breathing exercises should be included in regular medical intervention for early re-expansion and better prognosis in patients with pleural effusion.

FEV_1& FVC:

There were significant differences between both the groups at the end of the study. It means FEV_1 and FVC were more increased in segmental breathing group as compare to deep breathing group. Decreased FVC is also a common feature of restrictive disease. Any disease that affects the action of the chest or dispensability of lung tissue itself tends to reduce FVC. This space occupying lesion (pleural effusion) reduces FVC by compressing surrounding lung tissue. Restrictive diseases such as pleural disorder or pleural effusion may cause FEV_1 to be reduced. Reduction of FEV_1 occurs in much the same way as reduction in FVC. In this disease FVC and FEV_1 values are proportionately decreased. Some patient with moderate to severe restriction may have FEV_1 nearly equal to the FVC. The entire FVC is exhaled in the first second because it is reduced. [16,17] The physiological mechanism underlying the increase in forced vital capacity of deep breathing is probably due to deep inspiration and deep expiration with increased chest expansion and that more increased in segmental breathing group is probably due to deep inspiration along with facilitated intercostal muscle contraction with increased chest expansion at all levels.

Shrivya K. et al (2013) conducted the study to test 10 minutes of slow deep breathing (6 breaths/min) which have any effect on pulmonary function in healthy volunteers. From the result it is evident that immediate effect of deep breathing has shown significant improvement in FVC, FEV_1, PEFR. Physiological changes occurring during different phases of deep breathing are during inspiration, the lungs are expanded considerably and the walls of alveoli are stretched maximum. After a particular degree of stretching, the stretch receptors situated in the alveolar walls are stimulated. The stretch receptors are thus trained to withstand more and more stretching. During this phase the intra-pulmonary pressure is also raised and the diaphragm does not move freely. Therefore the alveoli in the lung apices are filled with air [17]

Vibhuti M. and Kumaria K. (June 2012) conducted study on effect of intercostal stretch on pulmonary function Parameters and they stated that the use of manual stretching procedures has become more prevalent in cardiorespiratory physiotherapy to improve pulmonary functions. The results of the study showed, FEV_1 and FVC in the experimental group significantly improved than the control group, which means intercostal stretch increased lung volume and lead to improved lung function. Therefore, future design of stretching protocol in cardiorespiratory physiotherapy may be considered in order to promote ventilation.[18]

Inspiratory Capacity (IC)

Pleural effusion is restrictive respiratory disease characterized by difficulty in inspiration may be because of abnormality in lungs or pleural cavity or patient may not be able to inspire due to collapse or restricted lung expansion. So in this condition we get reduced inspiratory capacity.

In deep breathing group there is significant increase in inspiratory capacity due to the lungs are expanded considerably and the walls of alveoli are stretched maximum. Physiological mechanism underlying in more increase of inspiratory capacity in segmental breathing group is probably due to deep inspiration with facilitation of intercostal muscle contraction by passive intercostal stretch prior to inspiration.

CONCLUSION

This study concludes that two weeks of segmental breathing exercises have better effect on chest expansion and pulmonary function than deep breathing exercises in pleural effusion.

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Physiotherapy in Patients with Chronic Obstructive Pulmonary Disease

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Abstract

BACKGROUND: Physiotherapy is an essential for the treatment of patients with chronic respiratory and inflammatory diseases according for chronic obstructive pulmonary disease (COPD).

AIM: To assess the effect of six months physiotherapy (PT) program on functional status in patients with COPD.

MATERIAL AND METHODS: The patients were divided into two groups according to the severity of the disease. Group A included 33 patients (mean age 69.8 ± 7.0, GOLD A – B stages); Group B included 32 patients (mean age 71.2 ± 6.9, GOLD C – D). They were referred to supervised PT program performed three times weekly for a half a year. All the patients were on standard medical care. At entry and after PT, six minutes walking test (6 MWT), Borg scale and modified Medical Research Council (mMRC) scale were assessed.

RESULTS: Significant changes in 6 MWT ($p < 0.001$) and mMRC scale ($p < 0.001$) were found after applied physical therapy program in patients of group A. [illegible] decreased significantly in patients with group A ($p < 0.001$). Positive changes were found in physical tolerance in the patients of group B ($p < 0.001$).

CONCLUSIONS: The present study revealed the positive effect of six months physiotherapy in physical condition and dyspnoea in patients with COPD at different stages of the disease.

Introduction

Chronic obstructive pulmonary disease (COPD) is a common disease that affects the bronchopulmonary system. The progressive course of COPD is connected with the development of extra pulmonary complications such as cardiovascular diseases, skeletal muscle dysfunction, osteoporosis, cachexy, anxiety and depression. Thus deteriorates the health related quality of life and increases physical intolerance in patients with COPD. Pulmonary rehabilitation is a multidisciplinary program for treating patients with chronic pulmonary diseases. It is individually tailored, and its principal goal is to optimize physical and social status of the patients. Physiotherapy (PT) is the milestone in the structure of pulmonary rehabilitation. PT increases exercise tolerance, mobility in daily activities, reduces breathlessness, improves quality of life by applying various therapeutic exercises and breathing techniques [1-3].

The study aims to assess the effect of the same six months physiotherapy protocol on functional status in patients with COPD at different stages of the disease.

Material and Methods

The patients with COPD were divided into two groups according to the stage of the disease. Group A consists of 11 males and 22 females with proven clinical and functional chronic obstructive pulmonary disease, mean age 69.8 ± 7.0. Patients are in the second to third stages of COPD according to GOLD (2014) and mean disease duration 7.3 years (5 to 12 years). Concomitant diseases include arterial hypertension (70%), ischemic heart disease (49%), diabetes type II (8%) and degenerative joint diseases including osteoporosis (9%). The number of concomitant diseases is on average 3.3 per person. Group B included four males and 28 women with COPD at an average age of 71.7 ± 8.8. Patients are in the first to second stages according to GOLD (2014) with mean disease duration 2.5 years (1.5 to 4 years). Concomitant diseases are a hypertonic disease (53%), ischemic heart disease (31%); type II diabetes mellitus (9%), and degenerative joint diseases including osteoporosis (6%). The number of concomitant diseases is an average of 3.0 per person.

The following including criteria for patients in the both groups were used: patients with clinical and paraclinical proven COPD, according to spirometric data; patients from both sexes, smokers and non-smokers; stable haemodynamic parameters; motivation and positive attitude while performing therapeutic exercises for a long time; informed written consent to participate in this research.

Exclusion criteria were: severe acute respiratory and cardiovascular failure; history of cerebrovascular accidents and/or myocardial infarction, within the past six months, and fractures of the lower extremities in the last three months; neurological and joint diseases, which can interfere implementation of the physiotherapeutic sessions and tests (such as rheumatoid arthritis, Parkinson's disease, polyneuropathy); decompensate diabetes mellitus; expressed cognitive impairments. The patients with COPD from the two groups were treated with adequate medication (bronchodilators, mucolytics, expectorants) and individual additional treatment for the patients with co-morbidities.

In the two groups, physiotherapy was performed according to our methodology developed for COPD patients in outpatient settings. The PT protocol was applied for six months, divided into three training periods - initial, main and final. The initial period includes the first 4-6 weeks and aimed patient's adaptation to the regular physical activity and creating habits for proper breathing. The main period lasts four months, aimed at achieving optimal therapeutic influence (improvement of the vital capacity, endurance and strength of the respiratory muscles, reduce symptoms, an increase of fitness level, prevention of the complications, normalisation of the cardiorespiratory function).

The final period covers the last 3-4 weeks, and in PT session's air baths, sun baths, water procedures and general physical strengthening and endurance training were included. For these reasons, a healing camp is being carried out in the early autumn months with a full-time activity program with moderate intensity and climatotherapy at the sea or in the mountain's balneology resorts, around 800 m average altitude. In the outpatient conditions, physiotherapeutic group sessions were conducted three times weekly with duration of 30 min at the beginning of the study, to one hour at the end, including aerobic exercises with low intensity (walking, slow running, cycling); entertaining and low intensity games; hiking; equilibrium exercises; resistance exercises; callisthenic exercises for all over fit in adults and the elderly with COPD.

The specific PT techniques included: teaching in correct physiological breathing, training in diaphragmatic breathing, breathing in the lower, middle, and upper portions of the lungs; breathing through the nose and mouth at rest and during exercises. Aiming to reduce of bronchoconstriction and dyspnoea we included exercises in different specific respiratory postures sitting on a chair; inhalations; slow breathing with an emphasis on the exhalation; self-massage of the intercostal muscles and the neck.

To increase the strength and endurance of the respiratory muscles we used in the PT sessions pushed, forced exhalation exercises; "coughing" exercises; exhale by pronouncing the syllables; exercise for prolonged inhalation and short-time exhale, combined with gymnastic exercises for the chest, abdominal and back muscles.

The following indicators, before and after the experimental period were monitored: six-minutes walking test, Borg Dyspnoea Scale and mMRC scale [4-6].

Results

Regarding the demographic and anthropometric data (sex, age, height and weight) both groups of patients with COPD were almost identical. During the experimental period, the patients in the group A and the group B (with different severity of COPD and varying degrees of functional impairments) were treated by our physiotherapeutic methodology, and objective information about the changes in the monitored parameters were collected. The obtained study results were statistically analyzed using SPSS version19.0, and a paired sample t-test was applied. The significance level was set up at p <0.05.

The results of the group A, concerning physical tolerance and the dyspnoea levels during daily or physical activities, are presented in table one. At the beginning of the experiment the patients in the group A, had worse indicators of the functional status due to the severity of the disease.

Table 1. Changes in the mean values of physical tolerance and levels of dyspnoea before and after physical therapy in group A

Measurement Tests (unit)	X̄₁ ± SD	X̄₂ ± SD	X̄₂-X̄₁	T	p
Six-minute walking test (m)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Borg Scale (points)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
mMRC Scale (points)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

Increasing walking distance with an average of 38 m was observed. The reported difference showed statistically significant improvement (p < 0.001). We believe that the improved tolerance to physical exercises was because specific exercises for the lower extremities were included in PT sessions. Similar results in patients at different stages of COPD have also been observed by some other authors [7-11].

Considering the importance and prevalence of the breathlessness as the main limiting factor for physical activity in patients with COPD, patients were examined using two additional special tests. One of the tests was used to evaluate the dyspnoea in performing daily activities (mMRC Dyspnoea Scale), and the other was used to assess the dyspnoea during physical exertion (Borg Dyspnoea Scale). According to the final research results for the patients in group A, a tendency for reducing the occurrence and severity of dyspnoea was reported. The changes were improved, based on the Borg Scale - 0.9 points (p < 0.01), as well as the mMRC Scale - an average of 0.2 points (p < 0.05). We believe that the reducing the feeling of breathlessness was associated with the following: improved bronchial patency and mechanics of breathing through learning, training and improving diaphragmatic breathing, exhaling through pursed lips, and exhaling while making whistling and buzzing sounds (producing a low-pitched sound resembling the bee humming). A diaphragmatic breathing technique is more economical for the body, but it is more difficult for women, who constitute the majority of the studied contingent. It became clear that decrease of this indicator has been achieved as a result of applying the physiotherapeutic methodology, where the special breathing exercises took place [12].

A baseline dyspnoea reduction of 0.8 points and improvement of the patient's subjective status after a six-month unsupervised home physiotherapeutic program which included physical exercises for strength and endurance was found [13]. Cirri E et al (2008) established higher levels of improvement in the feeling of shortness of breath in daily living after at least 15 physiotherapeutic sessions, applied to patients with all stages of COPD [14]. The obtained results from mMRC Scale decreased on average by 1.1 points, compared to the baseline levels, which had been on average 2.7 points. At the beginning of their study, the baseline status of the monitored patients showed a significantly pronounced dyspnoea when compared to our patients (1.8 points) probably due to including patients from the fourth COPD stage in their study.

The changes occurring in the physical tolerance and the feeling of breathlessness in group B before and after physiotherapy are presented on Table two.

Table 2. Changes in the mean values of physical tolerance and level of dyspnoea before and after physical therapy in group B

Measurement Tests (unit)	X̄₁ ± SD	X̄₂ ± SD	X̄₂-X̄₁	t	p
Six-minute walking test (m)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Borg Scale (points)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
mMRC Scale (points)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

The changes in 6MWT after the physiotherapeutic treatment were statistically significant (p < 0.001). The improvement in the walking distance for six minutes was on average 29 m, which was with 10 m less than the results of group A (38 m). According to the Enright P. (1998) formula, the referent value for healthy adults of the same age, height and weight, as the patients with COPD in the group B, was 452 m. After the initial examination the data obtained (427 m) represented 94% of the normative values, and at the end of the study, it corresponded to the normative value (456 m). Moreover, better physical tolerance was probably due to the lower degree of bronchial obstruction in the group B.

In the group B, increased dyspnoea levels were found with 1.65 points, according to the Borg Scale, tested after the 6MWT. However, after the final examination, dyspnoea levels (2.4 points) showed a lower degree (0-4 points), according to the ten-point Borg Scale.

Discussion

Our findings suggested that the results obtained in the group B would be favourable about the perceived breathlessness because the dyspnoea was kept at a relatively low level throughout the monitored period [15-19].

The baseline level of dyspnoea while performing daily living activities was almost unchanged, which was a favourable result, considering the nature and expected prognosis of COPD. Breathlessness in daily lifestyle in the group B was less pronounced (between 0-1 points), according to the five-point mMRC Scale, which indicated that the breathing disturbances occurred only after intense physical exertion, such as fast walking speed on a flat or a light slope surface, or climbing more than three floors of stairs. The dyspnoea did not adversely affect physical tolerance, objectified by a six minutes walk test. A lot of researchers recommend the Borg scale to assess the effect of performing physical therapy [20-25].

In conclusion, the present study revealed the positive effect of the same six months physiotherapy protocol on physical tolerance, the level of dyspnoea after physical exertion and during daily living activities in patients with COPD at the different stages of the disease and especially for the patients with more pronounced disease severity which is very important for PT practice.

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Effectiveness of a home-based pulmonary rehabilitation programme in pulmonary function and health related quality of life for patients with pulmonary tuberculosis: a pilot study

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Abstract

Background: [illegible]

Objective: [illegible]

Methods: [illegible]

Conclusion: [illegible]

Keywords: Pulmonary rehabilitation, pulmonary tuberculosis

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Introduction

[illegible]

[illegible]

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[illegible]

Methodology

Setting

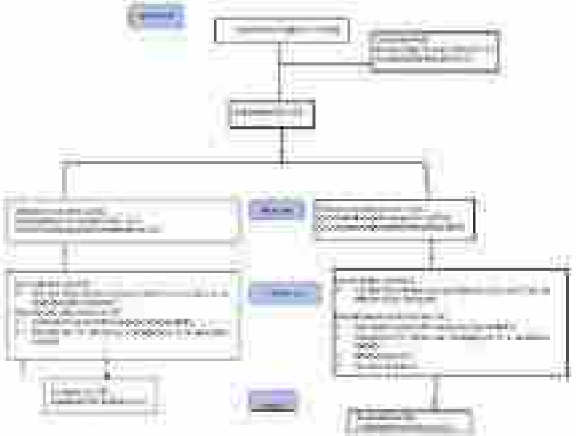
[illegible]

Study subjects and design

[illegible]

[illegible]

Figure 1: Consort flow diagram and demographic profile of participants



[illegible]

Instrumentation

[illegible]

Intervention Programme

[illegible]

Summary of Analysis

[illegible]

Results

[illegible]

Table 1: Demographic profile of participants

[illegible]

[illegible]

Pulmonary function

[illegible]

Table 2: Pulmonary parameters for participants (n=47)

[illegible]

Similarly, there were no significant differences between the two groups [illegible]

[illegible]

Table 4: Pulmonary [illegible] for [illegible] participants [illegible]

[illegible]

[illegible]

Exercise tolerance

In table 5, the difference in distance walked between the [illegible]

Table 5: Distance [illegible] for the Intervention and Control groups [illegible]

[illegible]

[illegible]

Discussion

Pulmonary Tuberculosis (PTB) has been described as a long term disability [illegible]

Health-related quality of life

The difference between the IG and CG over the 6 week period was not statistically significant [illegible]

[illegible]

Making inferences from the outcome of this pilot study [illegible]

The sociodemographic profile of the participants in this study [illegible]

When covariate analysis is carried out, no statistically significant differences [illegible]

[illegible] pulmonary rehabilitation.

Disclosures

We, the authors, hereby state that the work contained in this manuscript [illegible]

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