

The quality of life in COPD patients in the process of physical rehabilitation

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Abstract

Chronic obstructive pulmonary disease has a significant negative impact on the quality of life, including imposing restraints upon work, normal physical activity, housework, social and family activities, as well as sleep regimens. Rehabilitation has a leading place in the complex treatment of patients with chronic obstructive pulmonary disease. The objective of the study is to investigate the quality of life in patients with chronic obstructive pulmonary disease throughout the physical rehabilitation process. The research was based on a sample of 124 patients with severe chronic obstructive pulmonary disease being examined. The sample population was composed of 64 (51.61%) males and 60 (48.39%) females. Of the patient files reviewed, the average age was 59.19 ± 0.74 years. The author elaborated the physical rehabilitation programme for the patients, taking into account the results of the examination of the functional state, external respiration functions and physical activity. We used the Ukrainian version of the methodology for assessing the quality of life, which contains 100 questions, 4 questions for each of the 24 facets, as well as 4 "global questions" to assess the Overall Quality of Life and General Health. The questionnaire assesses the indices of the following domains: physical, psychological, independence level, social relationships, environment and spiritual sphere. The results of the study suggest that the application of the proposed physical rehabilitation programme in female and male patients with severe chronic obstructive pulmonary disease has allowed improving the overall quality of life and general health. Improvement of the quality of life was due to enhanced indicators in problematic facets. Patients in the experimental (study) group noted decreased discomfort, decreased drug addiction, increased mobility, increased vital activity, ability to perform daily tasks, decreased fatigue, improved sleep, enhanced thinking, as well as improved personal interactions.

Key words: chronic obstructive pulmonary disease, patients, physical rehabilitation, quality of life.

Introduction

Diseases and conditions of the respiratory system are the most common pathologies of the internal organs, which are characterised by a tendency to intensification. Chronic obstructive pulmonary disease (COPD) has a special place among such pathologies, as it remains one of the most prevalent and debilitating diseases for today. In the medical, social and economic terms, it is one of the leading causes of global morbidity and mortality. People suffer from this disease for years and prematurely die of it or its complications. The number of patients with COPD and multiple comorbidities has risen rapidly worldwide and this trend is associated with the long-term effects of risk factors and aging populations. The share of COPD, as one of the leading causes of mortality, is constantly increasing. Among adults aged 40 and older, 8 to 22 per cent develop COPD [6, 10, 17].

According to the results of large screening studies, the COPD prevalence is higher in smokers than in non-smokers, in people older than 40 years than in young men, in males more than in females. At the same time, the society knows little about this problem, and considering the cost of scientific research, the COPD ranks no. 13 [8, 9, 12]. According to WHO, more than 50% of patients with COPD seek medical attention at later stages of the disease. Meanwhile, the very early treatment of COPD prevents progression of the disease and provides the ability to lead an active lifestyle for many years. COPD has a significant negative impact on the quality of life, including imposing restraints upon work, normal physical activity, housework, social and family activities, as well as sleep regimens. In addition to these issues with everyday life, there is obviously a large number of suffering associated with hospitalisations caused by condition exacerbations [3, 8, 18].

The global strategy for prevention, diagnosis and management of COPD is developed by Global Initiative for Chronic Obstructive Lung Disease (GOLD), launched in 1997 in collaboration with the National Heart, Lung, and Blood Institute, National Institutes of Health, USA, and the World Health Organization. The latest revision of the GOLD strategy took place in 2018. GOLD materials emphasise that in developing countries direct COPD medical costs may be less important than the impact of COPD on workplace and home productivity. COPD is a major challenge for public health, but it can both be prevented and treated. COPD is the main cause of chronic complications and mortality worldwide; many people have suffered from this disease for

many years and die prematurely from the actual disease itself or its complications. The initiative states that the severe form of the disease affects not only the life of the patient, disrupting his ability to work and lowering the quality of life, but also affects his/her family members who have to take care of the patient [8, 12, 13].

Rehabilitation has a leading place in the complex treatment of patients with COPD. Pulmonary rehabilitation as a part of the daily treatment of patients is an effective intervention in COPD; it optimises the functional status of the patient and reduces the cost of treatment by stabilising or reducing the systemic manifestations of the disease [1, 4, 7, 15]. Despite the growing medical and rehabilitation possibilities of modern medical products and treatments, the problem of restorative treatment of patients with COPD does not lose its relevance, as evidenced by a decrease in the patients' quality of life; therefore, there is a need to find new methods for improving the effectiveness of the physical rehabilitation use.

Material And Methods

The research was conducted on the basis of the Pulmonary Department of the Rivne Regional Clinical Hospital. The results of the study were collected as patients started receiving inpatient treatment. The research was based on a sample of 124 patients with severe COPD being examined. The sample population was composed of 64 (51.61%) males and 60 (48.39%) females. Of the patient files reviewed, the average age was 59.19 ± 0.74 years. In a form of the randomised control trial (RCT) all patients were randomly assigned to one of two groups: the control group (32 males, 30 females) and experimental group (32 males and 30 females), proportional to admission. All patients had a standard clinical, laboratory and functional examination.

Results

In patients with COPD of severe stage, the foremost clinical manifestations of the pathology were complaints of significant dyspnoea, constant cough with phlegm; physical examination revealed weakened breathing, moderate or significant number of sibilant wheezes. Spirometry data revealed that the violations of external respiration function were significant.

The assessment of quality of life is an important tool for analysing the baseline health and treatment outcomes, as well as rehabilitation of COPD patients. It is a reliable, informative and reasonable method for determining the health status on both individual and group levels. Traditionally, physician and physical therapist evaluate the changes that occur in patients with COPD, as well as the effectiveness of treatment and rehabilitation, basing on the dynamics of complaints, objective data, and paraclinical indicators. At the same time, the patient's opinion remains formal, since the physician and physical therapist, using clinical, laboratory and instrumental methods, cannot determine the entire range of changes in the physical, mental and social status of the patient and the degree of his/her satisfaction with aspects of his/her own life. Despite the fact that separation of objective and subjective quality of life criteria remains a controversial issue, questionnaire is considered to be the main tool for quantifying this indicator. Using health-related quality of life (HRQoL) as an indicator allows to generally assess the degree of human adaptation to the disease and the ability to perform their usual functions, i.e. the impact of their health on their social participation within their current environment. Thus, to adequately assess all those measures for monitoring HRQoL the patient should answer a series of questions that will enable the assessor to exhaustively evaluate the information on how the patient rates his/her own condition. In order to assess the quality of life in patients with COPD, clinicians and public health officials also widely use St. George's Respiratory Questionnaire (SGRQ), proposed in 1992 [11]. However, as it is not adjusted to Ukrainian realities, we used the Ukrainian version of the World Health Organization Quality of Life Questionnaire (WHOQOL-100), designed to assess the quality of life of the adult population of Ukraine [14]. This questionnaire meets all international requirements for such questionnaires, namely, it is universal, because it covers all health parameters, it is recommended to determine the effectiveness of medical and social programmes in Ukraine, in accordance with international standards for assessing the quality of life of the population.

We used the Ukrainian version of the methodology for assessing the quality of life, which contains 100 questions, 4 questions for each of the 24 facets, as well as 4 "global questions" to assess the Overall Quality of Life and General Health. The questionnaire assesses the indices of the following domains: physical, psychological, independence level, social relationships, environment and spiritual sphere. All items were rated on a points-based system [14]. On the background of medical therapy, which was prescribed in line with the normative document, we conducted physical rehabilitation according to the severity of the disease. Patients of the control groups were rehabilitated in accordance with the recommendations of the normative document of the Ministry of Health of Ukraine. However, in the patients of the experimental group we used the proposed technology of physical rehabilitation, which envisaged taking into account the functional state of the patients.

Patients with severe COPD have lower motor performance; therefore, they used a benign training regimen. Patients in the control group used therapeutic exercises with a duration of 35-40 minutes, with 30-35 exercises at an average pace and course length of 1.9-2.7 km at a speed of 80-110 steps/min. Physical rehabilitation of the patients in the experimental group was based on the same principles, it was carried out according to the proposed programme, however also included assessment of the patient's condition, education of the patient, measures for the correction of body weight, physical training programmes, psychological support. The main objective of

physical rehabilitation was to reduce the intensity of dyspnoea, improve the external respiration function, increase physical activity tolerance, reduce the anxiety and depression associated with COPD, which in general should lead to a decrease in the number of hospital admissions and length of stay in hospitals, as well as to the improvement of the quality of life. The developed physical rehabilitation programme for each patient envisaged consideration of age characteristics, clinical picture of the disease and mechanism of its development, existing contraindications and precautions, specific physiological and psychopathological disorders, functional state and the level of physical preparedness, clear definition of the purpose and mechanism of influence of each exercise on the patient's body. At all stages of rehabilitation, the patients were trained to develop an understanding to follow the recommendations of the physician and physical therapist. An important point was the patient had to stop smoking, ensure proper nutrition, active lifestyle, and proper breathing. The physical rehabilitation programme was developed for each patient for long-term period. The average length of physical rehabilitation was 30 days and included stationary and ambulatory stages. The basis of the proposed physical rehabilitation programme was the endurance training in patients of the experimental groups, which was conducted on an exercise bike or a treadmill, using interval or continuous methods. Limit load during the first cycle ergometer test in patients with severe COPD in men and women – 50 W. Taking into account the initial indicators and all of the above factors, they developed a training programme for each patient. The optimum loading regime for each patient was selected together with the treating physician-pulmonologist, controlling the load tolerance. That is, they achieved a controlled increase in the physical activity of the patients and decreased dyspnoea with physical activity and fatigue. Exercises were used to increase the mobility and elasticity of the chest (active exhalation and breathing "through the compressed lips"), training of the respiratory muscles / lung capacity (breathing through a bendable straw into a basin 2/3 full of water), a bronchial toilet (positional drainage, multi-wave series percussion of the chest, learning to effectively expectorate), diaphragmatic breathing, vibrating massage of the chest, inhalation with mucolytic agents. As the patients' condition improved, the programmes were modified. The effect of the proposed technology of physical rehabilitation in the patients with severe COPD has been studied by assessing the motor performance of the patients with 6MST, the external respiration function and the functional state of the cardiopulmonary system. In addition, the team analysed the indicators of respiratory and blood circulation related to motor performance of the patients, in particular: respiratory rate, heart rate, and arterial pressure. We assessed the level of overall quality of life and general health for each patient with severe COPD at the beginning and end of the study, using the method of assessing the quality of life (WHOQOL-100), we in order to follow the changes and evaluate the effectiveness of the interventions in individual domains (see Table 1, 2 and Fig. 1, 2). Indicators of the individual domains assessed in the patients of the control group were as follows: domain I (physical domain) – 5.46 ± 0.15 , domain II (psychological domain) – 5.10 ± 0.13 , domain III (independence level) – 5.03 ± 0.16 , domain IV (social relationships) – 7.94 ± 0.13 , domain V (environment) – 6.65 ± 0.17 , domain VI (spiritual domain) – 10.57 ± 0.28 points.

Table 1. Average Values of the Quality of Life Indicators in the Female Patients with Severe COPD in Both Groups

Domains and Facets of the Quality of Life	Control Group (n =30)		Experimental Group (n =30)	
	Before	After	Before	After
	$\bar{x} \pm m$	$\bar{x} \pm m$	$\bar{x} \pm m$	$\bar{x} \pm m$
G1. Domain I. Physical Domain	5.46±0.15	5.53±0.13	5.36±0.17	9.26±0.18*
F1. Pain and discomfort	4.27±0.12	4.37±0.13	4.10±0.12	7.00±0.15*
F2. Vital activity, energy and fatigue	5.73±0.17	5.80±0.16	5.33±0.18	8.70±0.20*
F3. Sleep and rest	6.37±0.21	6.43±0.20	6.63±0.31	12.07±0.29*
G2. Domain II. Psychological Domain	5.10±0.13	5.17±0.13	5.43±0.21	9.31±0.28*
F4. Positive feelings	4.40±0.21	4.47±0.21	5.50±0.15	10.87±0.2*
F5. Thinking, learning, cognition	5.70±0.12	5.73±0.12	7.70±0.25	12.60±0.38*
F6. Self-esteem	4.63±0.09	4.70±0.10	4.43±0.14	6.57±0.36*
F7. Body image and appearance	4.43±0.28	4.53±0.28	5.10±0.27	8.30±0.22*
F8. Negative feelings	6.33±0.15	6.40±0.16	5.23±0.12	8.20±0.31*
G3. Domain III. Independence Level	5.03±0.16	6.14±0.09	5.41±0.14	8.13±0.10*
F9. Mobility, ability to move	6.60±0.14	7.57±0.18	6.70±0.15	9.20±0.14*
F10. Ability to perform everyday affairs	4.97±0.20	5.93±0.17	5.20±0.16	8.97±0.20*
F11. Drug and treatment addiction	4.63±0.26	5.97±0.16	5.27±0.18	6.43±0.15*
F12. Workability (ability to work)	3.90±0.16	5.10±0.12	4.47±0.23	7.93±0.12*
G4. Domain IV. Social Relationships	7.94±0.13	8.23±0.14	6.86±0.24	9.17±0.11*
F13. Personal relationships	6.73±0.24	7.23±0.21	5.77±0.16	7.97±0.16*
F14. Social support	10.37±0.26	10.80±0.20	9.63±0.36	11.33±0.16*
F15. Sexual activity	6.73±0.21	6.67±0.20	5.17±0.32	8.20±0.17*
G5. Domain V. Environment	6.65±0.17	8.00±0.08	6.45±0.18	6.42±0.18*
F16. Physical safety and security	6.27±0.31	8.07±0.23*	5.60±0.22	5.53±0.21
F17. Home surroundings	9.83±0.17	15.00±0.24	11.50±0.31	11.27±0.31
F18. Financial resources	6.80±0.25	6.90±0.25	6.47±0.20	6.47±0.20
F19. Medical and social assistance	5.03±0.27	5.97±0.21*	4.43±0.24	4.33±0.24
F20. Ability to obtain new information and skills	4.90±0.26	5.77±0.13	4.10±0.26	4.20±0.26
F21. Recreation / leisure opportunities	6.47±0.22	6.60±0.20	5.33±0.21	5.43±0.22
F22. Surrounding physical environment	8.27±0.29	9.57±0.20	8.33±0.33	8.27±0.33

F23. Transport	5.63±0.21	6.13±0.26*	5.80±0.17	5.87±0.18
G6. Domain VI. Spiritual Domain	10.57±0.28	10.57±0.28	11.07±0.29	11.57±0.20
F24. Spirituality, religion, beliefs	10.57±0.28	10.57±0.28	11.07±0.29	11.57±0.20
G. Overall Quality of Life and General Health	40.74±0.39	43.64±0.39	40.56±0.43	53.85±0.43*

Note * – indicator of the probability of discrepancies $p < 0.05$ between the indicators at the beginning and at the end of the study within the group

In certain domains of the study, the initial level of overall quality of life and general health in female patients of the experimental group consisted of the following: domain I (physical domain) – 5.36 ± 0.17 , domain II (psychological domain) – 5.43 ± 0.21 , domain III (independence level) – 5.41 ± 0.14 , domain IV (social relationships) – 6.86 ± 0.24 , domain V (environment) – 6.45 ± 0.18 , domain VI (spiritual domain) – 11.07 ± 0.29 points. At the end of the study in female patients of the control group, some indicators of the study domains somewhat improved, in particular: domain I (physical domain) – 5.53 ± 0.13 , domain II (psychological domain) – 5.17 ± 0.13 , domain III (independence level) – 6.14 ± 0.09 , domain IV (social relationships) – 8.23 ± 0.14 , domain V (environment) – 8.00 ± 0.08 , domain VI (spiritual domain) – 10.57 ± 0.28 points.

Nevertheless, in female patients of the experimental group in certain domains of study the average level significantly increased and was as follows: the domain I (physical domain) – 9.26 ± 0.18 ($p < 0.05$), domain II (psychological domain) – 9.31 ± 0.28 ($p < 0.05$), domain III (independence level) – 8.13 ± 0.10 ($p < 0.05$), domain IV (social relationships) – 9.17 ± 0.11 ($p < 0.05$), domain V (environment) – 6.42 ± 0.18 ($p < 0.05$) points, domain VI (spiritual domain) – 11.57 ± 0.20 points – insignificantly. In female patients with severe COPD of the experimental group the study revealed a statistically significant increase of the overall quality of life and general health in all domains and facets, except for the spiritual one. At the beginning of the study in male patients of the control group with severe COPD in certain study domains, the indicators were as follows: domain I (physical domain) – 5.36 ± 0.18 , domain II (psychological domain) – 5.88 ± 0.25 , domain III (independence level) – 5.40 ± 0.12 , domain IV (social relationships) – 7.19 ± 0.15 , domain V (environment) – 6.36 ± 0.17 , domain VI (spiritual domain) – 10.75 ± 0.35 points. The same low average starting level of the overall quality of life and general health was in the male patients of the experimental group; in them, according to certain study domains, it was as follows: domain I (physical domain) – 5.56 ± 0.19 , domain II (psychological domain) – 5.14 ± 0.16 , domain III (independence level) – 5.63 ± 0.12 , domain IV (social relationships) – 7.23 ± 0.23 , domain V (environment) – 6.20 ± 0.18 , domain VI (spiritual domain) – 11.13 ± 0.33 points.

Table 2. Average Values of the Quality of Life Indicators in the Male Patients with Severe COPD in Both Groups

Domains and Facets of the Quality of Life	Control Group (n=32)		Experimental Group (n=32)	
	Before	After	Before	After
	$\bar{x} \pm m$	$\bar{x} \pm m$	$\bar{x} \pm m$	$\bar{x} \pm m$
G1. Domain I. Physical Domain	5.36±0.18	6.76±0.10	5.56±0.19	9.22±0.08*
F1. Pain and discomfort	4.19±0.13	5.16±0.13	4.16±0.13	7.38±0.12*
F2. Vital activity, energy and fatigue	5.59±0.19	6.19±0.13	5.41±0.21	9.13±0.16*
F3. Sleep and rest	6.31±0.31	8.94±0.23	7.13±0.32	11.16±0.15*
G2. Domain II. Psychological Domain	5.88±0.25	6.26±0.23	5.14±0.16	9.86±0.09*
F4. Positive feelings	5.78±0.38	6.19±0.34	4.91±0.18	10.28±0.17*
F5. Thinking, learning, cognition	6.31±0.29	6.69±0.27	6.66±0.31	13.88±0.18*
F6. Self-esteem	4.81±0.21	5.19±0.21	4.34±0.08	7.22±0.18*
F7. Body image and appearance	6.25±0.26	6.63±0.24	3.97±0.22	9.13±0.16*
F8. Negative feelings	6.22±0.29	6.59±0.27	5.84±0.20	8.78±0.14*
G3. Domain III. Independence Level	5.40±0.12	6.29±0.09	5.63±0.12	7.74±0.07*
F9. Mobility, ability to move	6.25±0.21	7.69±0.19	6.81±0.24	8.53±0.13*
F10. Ability to perform everyday affairs	5.16±0.22	6.31±0.21	5.25±0.19	8.72±0.13*
F11. Drug and treatment addiction	5.84±0.12	6.03±0.18	5.81±0.13	6.13±0.12*
F12. Workability (ability to work)	4.34±0.15	5.13±0.17	4.63±0.16	7.59±0.11*
G4. Domain IV. Social Relationships	7.19±0.15	7.83±0.11	7.23±0.23	9.22±0.09*
F13. Personal relationships	5.81±0.20	6.88±0.25	6.16±0.20	8.16±0.15*
F14. Social support	9.47±0.29	10.09±0.20	9.84±0.33	10.91±0.18*
F15. Sexual activity	6.28±0.18	6.53±0.19	5.69±0.31	8.59±0.10*
G5. Domain V. Environment	6.36±0.17	6.38±0.16	6.20±0.18	6.52±0.14*
F16. Physical safety and security	6.09±0.33	6.03±0.31	5.44±0.28	5.88±0.25
F17. Home surroundings	9.06±0.20	8.97±0.20	10.59±0.13	10.66±0.14
F18. Financial resources	6.78±0.26	6.72±0.25	6.47±0.21	6.41±0.21
F19. Medical and social assistance	5.16±0.30	5.22±0.30	4.38±0.27	5.38±0.29*
F20. Ability to obtain new information and skills	4.88±0.25	4.94±0.26	4.31±0.26	5.25±0.29*
F21. Recreation / leisure opportunities	6.25±0.27	6.31±0.27	5.81±0.19	5.88±0.20
F22. Surrounding physical environment	7.09±0.24	7.16±0.24	7.06±0.24	7.13±0.25
F23. Transport	5.59±0.23	5.69±0.24	5.53±0.19	5.59±0.19
G6. Domain VI. Spiritual Domain	10.75±0.35	10.75±0.35	11.13±0.33	11.63±0.29
F24. Spirituality, religion, beliefs	10.75±0.35	10.75±0.35	11.13±0.33	11.63±0.29
G. Overall Quality of Life and General Health	40.94±0.45	44.27±0.47	40.88±0.45	54.18±0.37*

Note * – indicator of the probability of discrepancies $p < 0.05$ between the indicators at the beginning and at the end of the study within the group

As we see, in male patients with severe COPD a decrease in the quality of life occurred due to the impact of the disease on all facets of patients' lives. At the end of the study in male patients of the control group, some indicators of the study domains somewhat increased, in particular: domain I (physical domain) – 6.76 ± 0.10 , domain II (psychological domain) – 6.26 ± 0.23 , domain III (independence level) – 6.29 ± 0.09 , domain IV (social relationships) – 7.83 ± 0.11 , domain V (environment) – 6.38 ± 0.16 , domain VI (spiritual domain) – 10.75 ± 0.35 points. On the contrary, in certain study domains, the level of the overall quality of life and general health of male patients in the experimental group significantly increased, particularly: domain I (physical domain) – 9.22 ± 0.08 ($p < 0.05$), domain II (psychological domain) – 9.86 ± 0.09 ($p < 0.05$), domain III (independence level) – 7.74 ± 0.07 ($p < 0.05$), domain IV (social relationships) – 9.22 ± 0.09 ($p < 0.05$), domain V (environment) – 6.52 ± 0.14 ($p < 0.05$), domain VI (spiritual domain) – 11.63 ± 0.29 points – slightly.

Therefore, in male patients of the experimental group with severe COPD there has been a significant increase in the overall quality of life and general health in all domains and facets of the quality of life, except for the spiritual one.

The overall quality of life and general health status of each COPD patient in both groups and in the study are shown in Fig. 1 and Fig. 2.

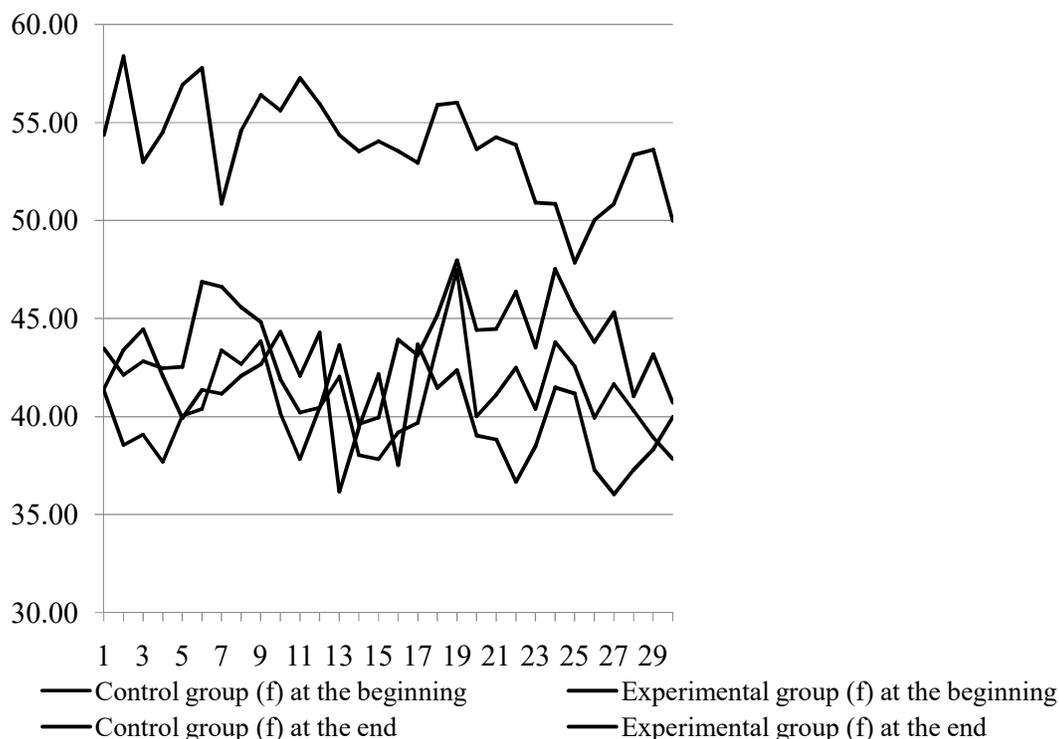


Fig. 1. The overall quality of life and general health status of each COPD patient in both groups and in the study.

At the beginning of the study we identified a low average level of overall quality of life and general health in female patients of both groups: in patients of the control group it was 40.74 ± 0.39 points and in women of the experimental group it was 40.56 ± 0.43 points.

At the beginning of the study, the average overall quality of life and general health in male patients with severe COPD was also low. In particular, in male patients of the control group, it was 40.94 ± 0.45 points. The male patients of the experimental group demonstrated the similar low average starting level of the overall quality of life and general health, i.e. it was 40.88 ± 0.45 .

As we can see, a decrease in the average level of overall quality of life and general health in the patients of both sexes with severe COPD occurred due to the impact of the disease upon all facets of the patients' lives.

At the end of the study the average level of the overall quality of life and general health in female patients of the control group slightly improved and was 43.64 ± 0.39 points. However, in female patients of the experimental group, the average level of the overall quality of life and general health significantly increased to 53.85 ± 0.43 ($p < 0.05$) points.

At the end of the study the average level of the overall quality of life and general health in male patients slightly improved and was 44.27 ± 0.47 points. Quite the reverse, in male patients of the experimental group, the average level of the overall quality of life and general health significantly increased to 54.18 ± 0.37 ($p < 0.05$) points.

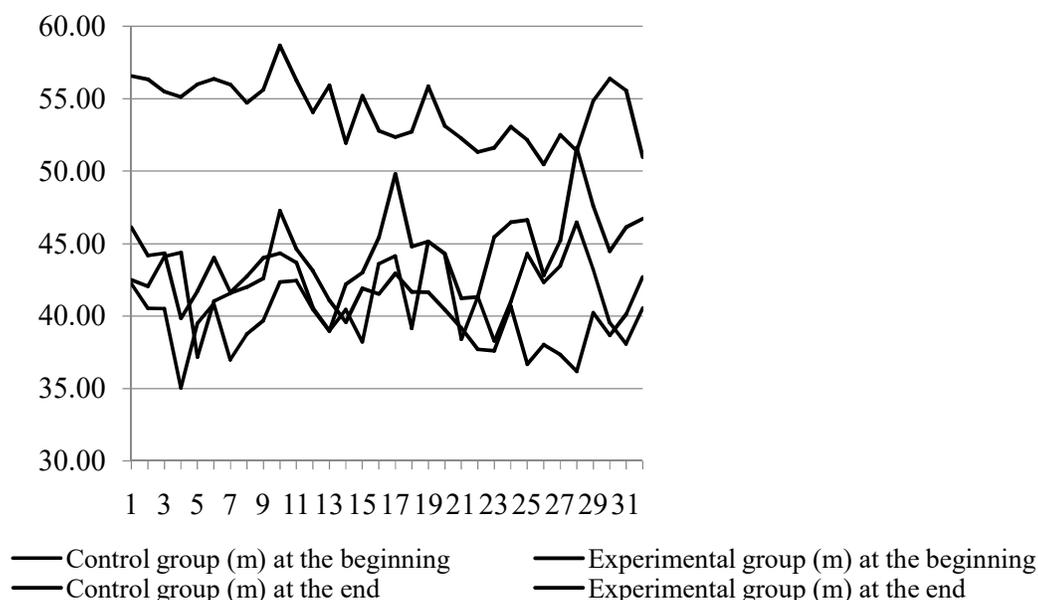


Fig. 2. The overall quality of life and general health status of each COPD patient in both groups and in the study.

Therefore, we can confirm that there has been a statistically significant increase in the overall quality of life and general health in all domains and facets of the quality of life, except for spiritual one, in the female and male patients of the experimental group with severe COPD.

Discussion

The wide introduction of physical rehabilitation to pulmonary practice is particularly relevant, as it is determined by contemporary notions of pulmonary and extrapulmonary disorders that develop as a result of COPD. Even with adequate medical treatment patients with COPD still feel weakness, experience decreased ability to work and exercise tolerance, depression, decrease in total and muscle mass, violations of the cardiovascular system, and sustain poor quality of life [2, 5, 16]. The quality of life is a subjective indicator that combines the components of the physical, mental, and social health of the sick person. WHO defines quality of life as an individual's perception of their position in life in relation to their capabilities. In other words, it is an objective indicator of subjective assessments covering a wide range of criteria. The level of the quality of life depends on the state of health, psychological status, independence level, social status, environmental factors and personal perceptions of an individual. The decrease in the overall quality of life in the female patients with severe COPD was due to the negative impact of the disease on all facets of the patients' lives.

From the above reasoning, it is clear that at the beginning of the study, the level of the overall quality of life in both female and male patients in both groups was approximately the same. After analysing the results of survey conducted among the patients with severe COPD in order to determine the overall quality of life and general health at the beginning of the study, we see that in comparison with the average data of healthy population, it is evident that the indicators of the physical domain, independence level and social relationships are decreased in patients of both the control and experimental groups. The lowest rates were obtained in the following facets: discomfort, positive feelings, ability to work, drug and treatment addiction, sexual activity, medical and social assistance, and they require appropriate rehabilitation pathway. As we can see, a decrease in the quality of life of the female and male patients with severe COPD occurred due to the impact of the disease on all facets of the patients' lives. The obtained data prove the necessity of applying individualised physical rehabilitation taking into account motor potential, in a complex with social and psychological rehabilitation of this category of patients. At the end of the study there has been a statistically significant ($p < 0.05$) increase in the overall quality of life and general health in all domains and facets of the quality of life, except for spiritual one, in the female and male patients of the experimental group with severe COPD. It was possible due to the application of the proposed physical rehabilitation programmes in the groups.

Conclusions

After the application of the proposed physical rehabilitation programme in female and male patients with severe COPD, we observed improvement of the overall quality of life and general health in the patients of the experimental group. Improvement of the quality of life was due to increased indicators in problematic facets. The patients in the experimental group noted decreased discomfort, decreased drug addiction, increased mobility, vital activity, ability to perform daily tasks, decreased fatigue, improved sleep, enhanced thinking, as

well as improved personal interactions. Simultaneously, only indicators of the spiritual domain demonstrated insignificant increase. Whereas, the female and male patients with severe COPD who were in the control group did not notice significant changes in the quality of life and general health.

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