

Original Article

The disease knowledge and self-care abilities of elderly chronic obstructive pulmonary disease patients following a rehabilitation program

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Abstract: Objective: To investigate the impact of a rehabilitation program on the disease knowledge and self-care abilities of elderly patients with chronic obstructive pulmonary disease (COPD). Method: A total of 45 elderly patients with COPD, ranging in age from 70-80 years old and admitted to our hospital were enrolled as the study cohort and randomly divided into a control group (n=22) and an experimental group (n=23). The control group was treated with routine nursing care, and the experimental group was given additional rehabilitation education. The two groups of patients were compared in terms of their knowledge of the disease and self-care abilities before the intervention and at 1 and 3 months after the intervention. Results: After the intervention, the patients' disease knowledge was assessed using questionnaires compiled by the hospital, and the scores in the experimental group were higher than the scores in the control group at the same time points ($P < 0.05$). The patients' self-care abilities were evaluated using the ESCA scale. The experimental group scored higher than the control group in four items, namely self-responsibility, health knowledge, self-care awareness, and self-care skills, and at one month after the intervention, the difference between the two groups was not significant. At 3 months after the intervention, the two groups showed statistically significant differences in these scores ($P < 0.05$). Conclusion: A rehabilitation program can effectively improve the disease knowledge and self-care abilities of elderly patients with COPD.

Keywords: Chronic obstructive pulmonary disease, rehabilitation program, disease knowledge, self-care

Introduction

Chronic obstructive pulmonary disease (COPD) is a common chronic disease characterized by persistent airflow limitation and respiratory symptoms. It is related to the abnormal inflammation of harmful particles or gases in the respiratory tract and lungs. The disease is usually progressive [1, 2]. At present, most patients with COPD pay more attention to the treatment in the acute phase. After the treatment process, the patients' clinical symptoms are initially alleviated, but the lungs are still in the process of chronic injury. Therefore, in the stable period after the acute treatment, the patients should be provided with rehabilitation education and comprehensive and personalized intervention, so as to improve their self-care abilities, reduce their risk of aggravation, reduce the number of repeated hospitaliza-

tions, and improve their quality of life [3]. Because elderly patients generally lack the ability to recognize the disease and perform self-care, and because they lack the means to use the Internet to learn about and understand the disease their disease conditions can easily worsen [4]. Therefore, rehabilitation programs should be strengthened for elderly patients with COPD, helping them receive more effective health care in the hospital and at home, improving their prognosis, prolonging their lives, and improving their quality of life.

The aim of this study was to combine a rehabilitation program with the treatment of elderly patients with COPD to analyze the effect of the rehabilitation program on their disease knowledge and self-care abilities, thus providing a theoretical basis for accelerating the rehabilitation of elderly patients with COPD and improving their prognoses.

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Materials and methods

General information

Elderly patients with COPD who were diagnosed at the Department of Respiratory Medicine of our hospital from July 2019 to July 2020, and who met the diagnostic criteria of *Global Initiative for Chronic Obstructive Pulmonary Disease* [5] were recruited as the study cohort. The cohort included 45 patients, including 25 males and 20 females, ranging in age from 70-80 (75.04 ± 3.28) years old.

Inclusion criteria: patients between 70 and 80 years old, patients who were able to take care of themselves, patients in a stable COPD phase, patients with normal cognitive functions and language abilities, and patients who lived near the hospital, so it was convenient to visit them.

Exclusion criteria: patients who had severe neurological diseases, severe functional disorders of the liver, kidney, or other organs, tumors, severe cardiovascular and cerebrovascular diseases, cognitive dysfunction, and patients who could not communicate normally.

The 45 subjects were randomly divided into a control group ($n=22$) and an experimental group ($n=23$). The control group had 13 males and 9 females, with an average age of (74.95 ± 3.15) years, and the experimental group had 12 males and 11 females, with an average age of (75.23 ± 3.25) years ($P > 0.05$), and the two groups were comparable.

Personal files were established for the patients enrolled in the study, and the baseline data such as each patient's name, gender, age, telephone number, and address were registered, and the informed consent forms were signed by the patients. This study was reviewed and approved by the ethics committee of the First People's Hospital of Wenling.

Intervention methods

The control group underwent routine nursing care after their discharge. Intensive guidance and health education were provided before their discharge, and the patients were reminded to adhere to the regular dosage of medication, to breathe deeply, and to follow their dietary suggestions.

After their discharge, a rehabilitation program was provided in the experimental group in addition to the routine nursing care. A rehabilitation education team, consisting of two physicians, four nurses, a psychologist and a nutritionist, was set up. Before their discharge, a comprehensive assessment of each patient was conducted, and an individualized rehabilitation program was formulated according to the patient's age, physical condition, and duration of illness. The patients were followed up daily with Wechat and monthly with home visits. The content of the rehabilitation program was as follows.

(1) Medication guidance: The patients followed the doctor's medication instructions. The importance and proper use of home oxygen therapy were emphasized for disease control, and the patients received oxygen therapy for approximately 15 hours per day with the oxygen concentration set between 1-2 L/min [6, 7]. Through lectures and demonstrations by the nurse, the patients learned how to cough up sputum and breathe deeply, and the families will learn how to provide assistance.

(2) Psychological guidance: As COPD is an irreversible disease, the older patients are prone to recurring illnesses. Members of the rehabilitation education team strengthened their communication with the patients, paid attention to the changes in their moods during the follow-up and home visits, encouraged them to communicate more with their relatives, friends and patients, and urged the family members to give more understanding, care, support and companionship so as to improve their adverse moods [8].

(3) Dietary guidance: The nutritionist on the team formulated the nutritional plans, cultivated good living and eating habits in patients with low oil, low salt, low sugar, high protein and high fiber levels according to the dietary habits and tastes of the elderly patients. The consumption of spicy food, smoking, and drinking alcohol were strictly prohibited [9].

(4) Rehabilitation and exercise guidance: An individualized exercise program was developed according to the physical condition of the elderly. The patients were encouraged to do some chores in their daily lives, participate in rehabilitation exercises, and perform a moderate amount of upper limb exercises and walk a reasonable distance every day. The patients physical fitness was regularly evaluated and their

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Table 1. Comparison of the baseline data in the two groups ($\bar{x} \pm s$)/[n (%)]

Baseline data		Control group (n=22)	Experimental group (n=23)	t/X ²	P
Gender	Male	13	12	0.333	0.795
	Female	9	11		
Average age (years)		74.95 ± 3.15	75.23 ± 3.25	0.261	0.797
Average duration (years)		7.11 ± 4.38	7.37 ± 3.70	0.285	0.779
Average smoking history (years)		16.23 ± 9.36	16.63 ± 9.71	0.159	0.875

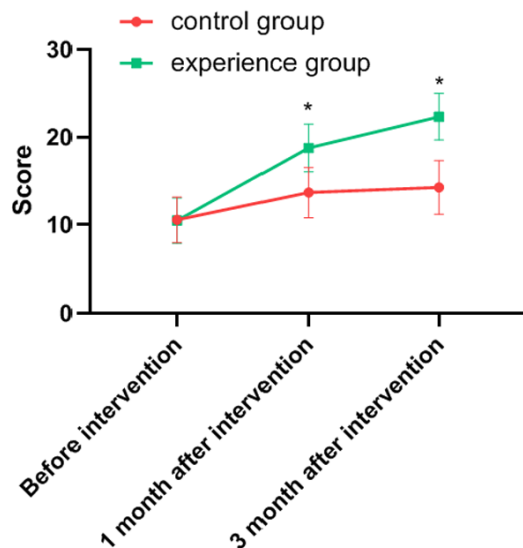


Figure 1. Analysis of the changes in the patients' disease knowledge scores before and after the intervention in the two groups. *P < 0.05.

exercise program was adjusted according to the results of the evaluation [10].

Observational indicators

Analysis of the disease knowledge before and after intervention: The COPD knowledge questionnaire [11, 12] prepared by our hospital, contains 27 items covering four areas, including basic knowledge of COPD (10 items), attitudes toward the disease (6 items), precautions (6 items), and knowledge of rehabilitation training (5 items). It was scored on a 2-point scale (0-1), with 1 point representing full knowledge and 0 points representing no knowledge, and the higher the score, the better the patient's knowledge of COPD.

Changes in the patients' self-care abilities before and after the intervention: The Self-Care Competence Scale (ESCA) was used to assess self-care abilities in the two groups of patients. The ESCA scale was developed by Kearney and Fleischer in 1979, and a study of its reliability

and validity was completed by Nahcivan in 1994. The scale contains four items: self-nursing responsibility, health knowledge level, self-care concepts, and self-care skills, and it is scored on a 5-point scale (0-4), with 4 being very compliant and 0 being not at all compliant, and the patient's self-care ability increases with an increase in the scale score [13].

Statistical analysis

The collected data were entered into SPSS 20.0 software for the statistical analysis, and the mean ± standard deviation ($\bar{x} \pm s$) was used to represent the measurement data. Differences between groups were compared using t tests, and P < 0.05 was considered statistically significant.

Results

A comparison of the differences in baseline data in the two groups

There were no significant differences in the baseline data in terms of gender, age, disease duration, or smoking history in the two groups (P > 0.05), which were comparable (Table 1).

Analysis of the disease knowledge before and after intervention

After assessing the two groups with a COPD knowledge test questionnaire, the scores in the control group (10.56 ± 2.61) and the experimental group (10.48 ± 2.58) exhibited no significant differences before intervention (P > 0.05), but the scores of both groups showed a significant improvement after intervention, and the experimental group had higher scores than the control group (P < 0.05) (Figure 1).

Changes in self-care abilities before and after intervention

There was no statistically significant difference in the self-care ability scores in the two groups

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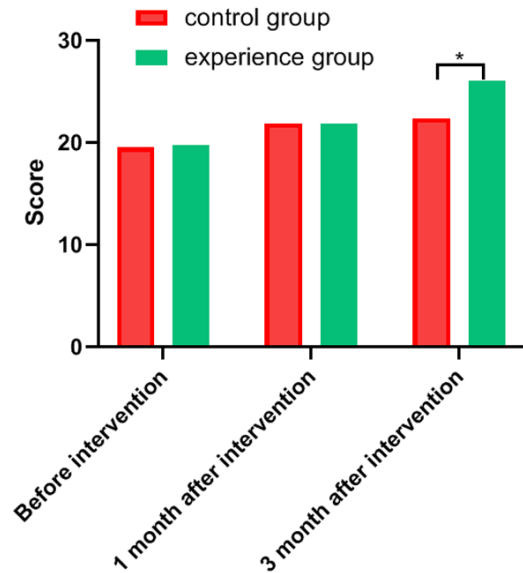


Figure 2. An analysis of the changes in the self-care ability-self-responsibility scores before and after the intervention. * $P < 0.05$.

before and at one month after intervention ($P > 0.05$).

After the rehabilitation program, the patients' self-responsibility was scored using the ESCA scale, with a score of 19.53 ± 1.42 in the control group and 19.71 ± 1.13 in the experimental group (19.71 ± 1.13) before the intervention, and at one month after the intervention, both groups improved their self-responsibility scores compared to their pre-intervention scores, with a score of 21.84 ± 1.45 in the control group and 21.91 ± 1.11 in the experimental group ($P > 0.05$). At three months after the intervention, the self-responsibility scores in the experimental group were significantly higher than they were in the control group ($P < 0.05$) (**Figure 2**).

After the rehabilitation education intervention, the patients' health knowledge levels were scored using the ESCA scale, with a pre-intervention score of 32.56 ± 3.07 in the control group and 32.08 ± 3.34 in the experimental group, and at one month after the intervention, both groups improved their health knowledge scores compared to their pre-intervention scores, with a score of 33.85 ± 2.54 in the control group and 34.23 ± 3.10 in the experimental group ($P > 0.05$). At 3 months after the intervention, the health knowledge score was (34.67 ± 2.45) in the control group, which was

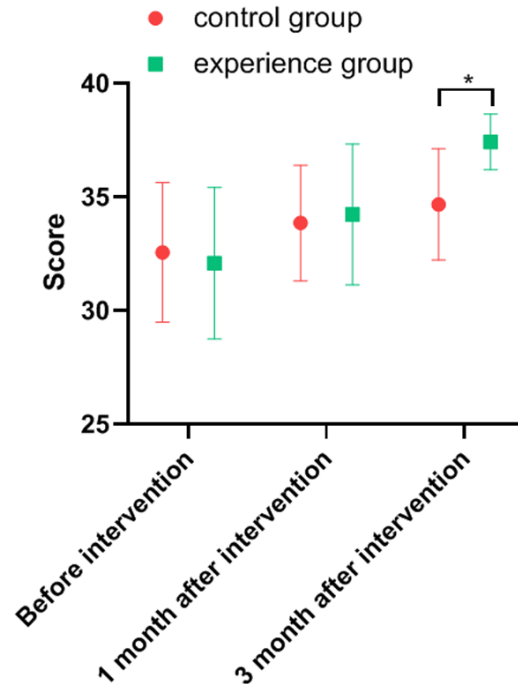


Figure 3. An analysis of the changes in the self-care ability-health knowledge level scores before and after the intervention. * $P < 0.05$.

lower than the score of (37.42 ± 1.23) in the experimental group ($P < 0.05$) (**Figure 3**).

After the rehabilitation education intervention, the concept of self-care was scored using the ESCA scale, with a score of 16.58 ± 3.92 in the control group and 16.28 ± 4.53 in the experimental group before the intervention, and at 1 month after the intervention, the self-care concept scores improved in both groups compared to the pre-intervention scores, with a score of 16.95 ± 3.54 in the control group and 17.25 ± 4.83 in the experimental group ($P > 0.05$). At three months after the intervention, the self-care concept score in the experimental group was significantly higher than it was in the control group ($P < 0.05$) (**Figure 4**).

The patients' self-care skills were scored, with a score of 28.84 ± 7.35 in the control group and 29.04 ± 8.12 in the experimental group before the intervention. At 1 month after the intervention, their self-responsibility scores were improved, with a score of 30.15 ± 7.64 in the control group and 31.02 ± 7.43 in the experimental group. At 3 months after the intervention, the self-care skills scores in the experimental group were higher (32.58 ± 7.17)

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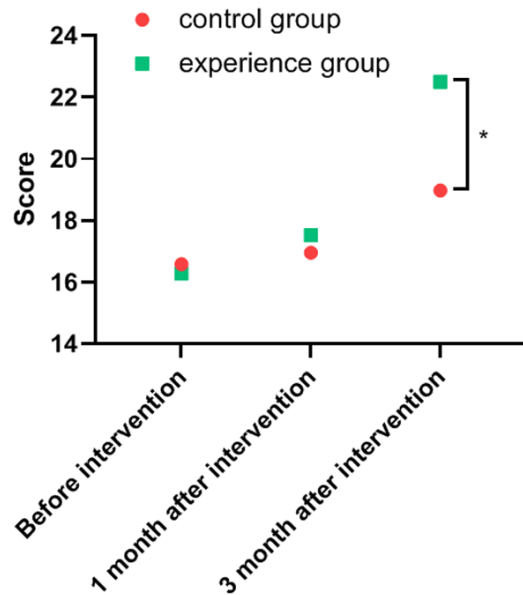


Figure 4. An analysis of the changes in the self-care ability-self-care concept scores before and after the intervention. * $P < 0.05$.

than the scores in the control group (38.66 ± 8.15) ($P < 0.05$) (Figure 5).

Discussion

As the aging of the population intensifies, severe air pollution caused by urbanization and rapid economic development and the high number of smokers, the number of COPD patients in our country has reached nearly 100 million, and the prevalence is still rising. According to the Global Initiative for Chronic Obstructive Pulmonary Disease (2019), COPD has become the fourth most common disease in the world in terms of morbidity and mortality, and has become a worldwide public health problem [14-16]. The onset of COPD is relatively slow and the course of the disease is long. Patients are prone to recurring illnesses, leading to a decline in lung function, which directly affects the prognosis of the disease. After discharge, due to the lack of professional nursing guidance, the rehabilitation effect in the stable phase is unsatisfactory. Especially for the elderly patients with COPD, the autoimmune function is relatively low and the body's resistance is poor, and they are more likely to suffer from acute attacks due to neglecting their periodic rehabilitation treatment [17, 18]. Studies have shown that only a small number of patients with COPD follow their doctor's

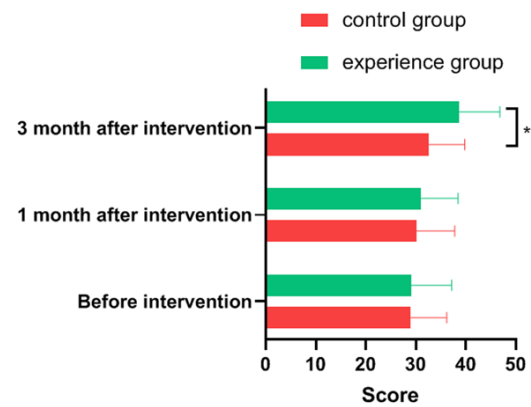


Figure 5. An analysis of the changes in the self-care ability-self-care skills scores before and after the intervention. * $P < 0.05$.

advice to take their regular medications and use inhaled drugs correctly, and as few as 10% of patients, due to non-medication or non-compliance, and inadequate knowledge of the disease, patients often have serious consequences such as relapse, deterioration, and the increased risk of readmission [4, 19, 20].

More countries have focused on the use of health education to improve the quality of life of patients with COPD [21, 22]. Through the implementation of rehabilitation education, the patients can correctly understand the disease, improve their self-care abilities, and enhance their confidence in the cure [23, 24].

Considering the characteristics of elderly patients, this study combined routine care with professional rehabilitation education, including medication guidance, psychological guidance, dietary guidance, rehabilitation, and exercise guidance to meet the needs of elderly patients in terms of their medication, diet, and psychological aspects. Regular follow-up and home visits to patients enhance the relationship with patients, providing timely answers to the patients' physical, mental, and psychological concerns, eliminating negative feelings such as anxiety, depression, and pessimism. Through rehabilitation education intervention, the cognitive and self-care abilities of the patients in the experimental group were significantly improved, which is consistent with the conclusions of other scholars.

In summary, a rehabilitation program can significantly improve the cognitive and self-care

abilities of elderly patients with COPD, so it is worthy of clinical promotion and application. The innovation of this study is to combine the rehabilitation program with routine nursing care, providing elderly patients with rehabilitation education, thereby increasing the patients' awareness of the disease and improving their self-care abilities, so it is highly applicable. The shortcomings of this study include the following: (1) The sample selected was geographically diverse, the sample size included in the study was small, and the results lacked generalizability. (2) Lack of a long-term evaluation of the elderly COPD patients. To address these shortcomings, studies with larger sample sizes and longer follow-up times will be conducted in the future.

Disclosure of conflict of interest

None.

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References

- [1] Rothnie KJ, Müllerová H, Hurst JR, Smeeth L, Davis K, Thomas SL and Quint JK. Validation of the recording of acute exacerbations of copd in uk primary care electronic healthcare records. *PLoS One* 2016; **11**: e0151357.
- [2] Ninane V, Corhay JL, Germonpré P, Janssens W, Joos GF, Liistro G, Vincken W, Gurdain S, Vanvlasselaer E and Lehouck A. Inhaled treatment of COPD: a Delphi consensus statement. *Int J Chron Obstruct Pulmon Dis* 2017; **12**: 793-801.
- [3] Spruit MA, Singh SJ, Garvey C, ZuWallack R, Nici L, Rochester C, Hill K, Holland AE, Lareau SC, Man WD, Pitta F, Sewell L, Raskin J, Bourbeau J, Crouch R, Franssen FM, Casaburi R, Vercoulen JH, Vogiatzis I, Gosselink R, Clini EM, Effing TW, Maltais F, van der Palen J, Troosters T, Janssen DJ, Collins E, Garcia-Aymerich J, Brooks D, Fahy BF, Puhan MA, Hoogendoorn M, Garrod R, Schols AM, Carlin B, Benzo R, Meek P, Morgan M, Rutten-van Mölken MP, Ries AL, Make B, Goldstein RS, Dowson CA, Brozek JL, Donner CF and Wouters EF. An official American Thoracic Society/European Respiratory Society statement: key concepts and advances in pulmonary rehabilitation. *Am J Respir Crit Care Med* 2013; **188**: e13-64.
- [4] Restrepo RD, Alvarez MT, Wittnebel LD, Sorenson H, Wettstein R, Vines DL, Sikkema-Ortiz J, Gardner DD and Wilkins RL. Medication adherence issues in patients treated for COPD. *Int J Chron Obstruct Pulmon Dis* 2008; **3**: 371-384.
- [5] Singh D, Agusti A, Anzueto A, Barnes PJ, Bourbeau J, Celli BR, Criner GJ, Frith P, Halpin DMG, Han M, López Varela MV, Martínez F, Montes de Oca M, Papi A, Pavord ID, Roche N, Sin DD, Stockley R, Vestbo J, Wedzicha JA and Vogelmeier C. Global strategy for the diagnosis, management, and prevention of chronic obstructive lung disease: the GOLD science committee report 2019. *Eur Respir J* 2019; **53**: 1900164.
- [6] Murphy PB, Rehal S, Arbane G, Bourke S, Calverley PMA, Crook AM, Dowson L, Duffy N, Gibson GJ, Hughes PD, Hurst JR, Lewis KE, Mukherjee R, Nickol A, Oscroft N, Patout M, Pepperell J, Smith I, Stradling JR, Wedzicha JA, Polkey MI, Elliott MW and Hart N. Effect of home noninvasive ventilation with oxygen therapy vs oxygen therapy alone on hospital readmission or death after an acute COPD exacerbation: a randomized clinical trial. *JAMA* 2017; **317**: 2177-2186.
- [7] Criner GJ, Dreher M, Hart N and Murphy P. COPD home oxygen therapy and home mechanical ventilation: improving admission-free survival in persistent hypercapnic COPD. *Chest* 2018; **153**: 1499-1500.
- [8] Hussain FA and Williams S. COPD: a proposed multidisciplinary approach to psychological issues. *Br J Nurs* 2017; **26**: 1109-1115.
- [9] Guilleminault L, Rolland Y and Didier A. Characteristics of non-pharmacological interventions in the elderly with COPD. Smoking cessation, pulmonary rehabilitation, nutritional management and patient education. *Rev Mal Respir* 2018; **35**: 626-641.
- [10] Corlăţeanu A, Odajiu I, Botnaru V and Cemirtan S. From smoking to COPD-current approaches. *Pneumologia* 2016; **65**: 20-23.
- [11] Jia G, Lu M, Wu R, Chen Y and Yao W. Gender difference on the knowledge, attitude, and practice of COPD diagnosis and treatment: a national, multicenter, cross-sectional survey in China. *Int J Chron Obstruct Pulmon Dis* 2018; **13**: 3269-3280.
- [12] Wong CK and Yu WC. Correlates of disease-specific knowledge in Chinese patients with COPD. *Int J Chron Obstruct Pulmon Dis* 2016; **11**: 2221-2227.
- [13] Yamashita M. The exercise of self-care agency scale. *West J Nurs Res* 1998; **20**: 370-381.
- [14] Karasu F and Aylaz R. Evaluation of meaning of life and self-care agency in nursing care given to chronic obstructive pulmonary patients according to health promotion model. *Appl Nurs Res* 2020; **51**: 151208.

Elderly chronic obstructive pulmonary disease patients

- [15] Wang G, Liu B, Cao Y, Du Y, Zhang H, Luo Q, Li B, Wu J, Lv Y, Sun J, Jin H, Wei K, Zhao Z, Kong L, Zhou X, Miao Q, Wang G, Zhou Q and Dong J. Effects of two Chinese herbal formulae for the treatment of moderate to severe stable chronic obstructive pulmonary disease: a multi-center, double-blind, randomized controlled trial. *PLoS One* 2014; 9: e103168.
- [16] Leivseth L, Brumpton BM, Nilsen TI, Mai XM, Johnsen R and Langhammer A. GOLD classifications and mortality in chronic obstructive pulmonary disease: the HUNT Study, Norway. *Thorax* 2013; 68: 914-921.
- [17] Mantero M, Rogliani P, Di Pasquale M, Polverino E, Crisafulli E, Guerrero M, Gramegna A, Cazzola M and Blasi F. Acute exacerbations of COPD: risk factors for failure and relapse. *Int J Chron Obstruct Pulmon Dis* 2017; 12: 2687-2693.
- [18] Hartl S, Lopez-Campos JL, Pozo-Rodriguez F, Castro-Acosta A, Studnicka M, Kaiser B and Roberts CM. Risk of death and readmission of hospital-admitted COPD exacerbations: European COPD Audit. *Eur Respir J* 2016; 47: 113-121.
- [19] Couillard S, Larivée P, Courteau J and Vanasse A. Eosinophils in COPD exacerbations are associated with increased readmissions. *Chest* 2017; 151: 366-373.
- [20] Kessler R, Ståhl E, Vogelmeier C, Haughney J, Trudeau E, Löfdahl CG and Partridge MR. Patient understanding, detection, and experience of COPD exacerbations: an observational, interview-based study. *Chest* 2006; 130: 133-142.
- [21] Rinaldo N, Bacchi E, Coratella G, Vitali F, Milanesi C, Rossi A, Schena F and Lanza M. Effects of combined aerobic-strength training vs fitness education program in COPD patients. *Int J Sports Med* 2017; 38: 1001-1008.
- [22] Wouters EFM, Wouters BBREF, Augustin IML, Houben-Wilke S, Vanfleteren LEGW and Franssen FME. Personalised pulmonary rehabilitation in COPD. *Eur Respir Rev* 2018; 27: 170125.
- [23] Klauser P, Baker ST, Cropley VL, Bousman C, Fornito A, Cocchi L, Fullerton JM, Rasser P, Schall U, Henskens F, Michie PT, Loughland C, Catts SV, Mowry B, Weickert TW, Shannon Weickert C, Carr V, Lenroot R, Pantelis C and Zalesky A. White matter disruptions in schizophrenia are spatially widespread and topologically converge on Brain Network Hubs. *Schizophr Bull* 2017; 43: 425-435.
- [24] Altenburg WA, Bossenbroek L, de Greef MH, Kerstjens HA, ten Hacken NH and Wempe JB. Functional and psychological variables both affect daily physical activity in COPD: a structural equations model. *Respir Med* 2013; 107: 1740-1747.