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Original Article

Transitional care for patients with chronic obstructive pulmonary disease

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ABSTRACT

Objectives: To observe the effects of transitional care on the quality of life of chronic obstructive pulmonary disease (COPD) patients.

Methods: A total of 114 COPD patients were recruited from the First Affiliated Hospital, Sun Yat-sen University, Guangzhou, China and divided equally into an intervention group and control group. Following discharge, patients from the intervention group received three-months intervention in addition to regular nursing care, while control group patients received regular nursing care only. Patients' quality of life was measured using the St. George's respiratory questionnaire (SGRQ), the 12-item General Health Questionnaire (GHQ-12) and body mass index (BMI).

Results: The symptoms section score, the activity section score, the impacts section score, the total score and the rate of mental disorders were significantly changed after the intervention while there was no statistical difference in BMI between groups.

Conclusions: Transitional care can improve health-related quality of life in COPD patients who have recently suffered an exacerbation.

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1. Introduction

Chronic obstructive pulmonary disease (COPD) is a major public health problem characterized by chronic airflow

limitation and a range of pathological changes in the lung, some significant extra-pulmonary effects, and important comorbidities which may contribute to the severity of the disease in individual patients. Thus, both the pulmonary aspect of the disease and significant comorbidities must be

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considered when determining appropriate treatment [1]. COPD patients' quality of life is negatively affected by disease exacerbations, progressive loss of lung function, and unsatisfactory therapeutics. Patients often have low self-esteem, self-blame, anxiety, depression and other psychological symptoms.

According to the American Geriatrics Society, translational care is defined by a continuity of care through a series of actions designed to ensure that patients in different health care settings (e.g. from hospital to home) and the same health care settings (e.g. different hospital departments) receive different levels of collaboration and continuity of care [2]. This care includes family care following hospital discharge and hospital discharge planning [3].

Since the 1990s, major Western countries and Hong Kong began to implement translational care for discharged patients with positive results. Specific to this implementation was early follow-up, development of a detailed evaluation form, a strategic plan to treat high-risk patients including pre-term children, the elderly, and organ transplant recipients [4].

2. Material and methods

2.1. Study population

The study recruited 114 patients who were admitted to the First Affiliated Hospital, Sun Yat-sen University, Guangzhou, China Department of Respiratory Medicine due to acute exacerbation of COPD between September 2008 to March 2011. Inclusion criteria included a diagnosis of COPD characterized by inhaled bronchodilator $FEV_1/FVC < 70\%$, FEV_1 predicted percentage $< 80\%$; ability to care for themselves during stable periods; and willingness to sign an informed consent form. Patients were excluded if they had a co-existent medical problem (e.g. bronchial asthma, suspected malignancy, cardiac failure); cognitive impairment or lack of social support; or limb movement disorder.

The 114 COPD patients were divided into an intervention group (57 cases) and control group (57 cases) randomly. The intervention group received follow-up intervention for three months in addition to regular nursing care while the control group received regular nursing care only.

2.2. Data collection and management

2.2.1. Establishing transitional care research team

A transitional care research team was established in 2007 including one full-time staff member in charge of discharged patients' transitional care, three researchers, three nurses working in department of Respiratory Medicine, and 12 community nurses. All members of the team completed a "chronic obstructive pulmonary disease transitional care training course" and successfully passed the examination. In addition, in 2008 the hospital established an outpatient on specialist care of patients with COPD, regular visited by a nurse specialist who is responsible for the patient follow-up after discharge. Researchers and ward nurses are mainly responsible for the assessment and guidance of patients with COPD during hospitalization. The members of transitional care

research team are responsible for patient follow-up after discharge.

2.2.2. Method of transitional care

In this study, transitional care was divided into two phases. The first stage consisted of a comprehensive patient assessment by researchers and ward nurses a week prior to hospital discharge; completing general personal information, St. George's respiratory questionnaire (SGRQ), the 12-item general health questionnaire (GHQ-12) and body mass index (BMI), and intervention group treated with targeted health education and guidance; and establishment of a file for discharge planning according to specific needs of patients. The second stage consisted of research team members providing patients with a three-month follow-up after discharge, including phone calls at 3, 5, 7, and 9 weeks after discharge, and home visits at 72 hours and 3 months post-discharge. For telephone follow-ups, we established and used the "telephone follow-up records for patients with COPD" form. This takes into account symptoms and signs of patients, complications or new symptoms, psychosocial, family rehabilitation, health behaviors and environment. By asking and communicating with the patients, we found patient existing health problems and recorded, then provided targeted interventions. For home visits, environmental risk factors of the patients were assessed, along with on-site assessment and health guidance to improve patient self-care skills and enhance patient compliance of discharge planning. Patient information, including the SGRQ, GHQ-12 and BMI, were also collected during the second home visit.

2.3. Measures of transitional care – home-based pulmonary rehabilitation

The main goal of pulmonary rehabilitation is through daily activities to reduce symptoms, improve quality, improve and enhance the physical fitness and emotion. The care package provided to patients at home included respiratory muscle training, rehabilitation exercise, home oxygen therapy, nutrition support and psychological support. Respiratory muscle training included: pursed lip breathing where patients preferred sitting, standing or lying, breathing with nasal, shrinking lips like fish head shape, and breathing slowly through the pursed lips with an inspiratory and expiratory ratio of 1:2, exercise 5 minutes, 3 times per day; abdominal breathing where patients were comfortable position, relax, relax the abdomen when inhaling, the abdomen bulge, exhale abdominal contraction, sunken abdomen, exhale push hands as needed ribs and abdomen can be used to promote abdominal contraction, initial stage of abdominal breathing exercises twice a day, every 10–15 minutes. Pursed lip breathing can be applied together with abdominal breathing. Rehabilitation exercise consisted of exercises such as walking, boarding a ladder, and upper limbs exercise, twice per day for 10–15 minutes. Home oxygen therapy consisted of long-term oxygen therapy (LTOT) to improve survival in patients with COPD, improve patient hemodynamics, hematologic characteristics, exercise capacity, lung physiology and mental state [5]. Patients were expected to adhere to oxygen for at least 15 hours per day and when necessary at a rate of 1–2 L/min. Nutrition support was offered to address COPD as a wasting

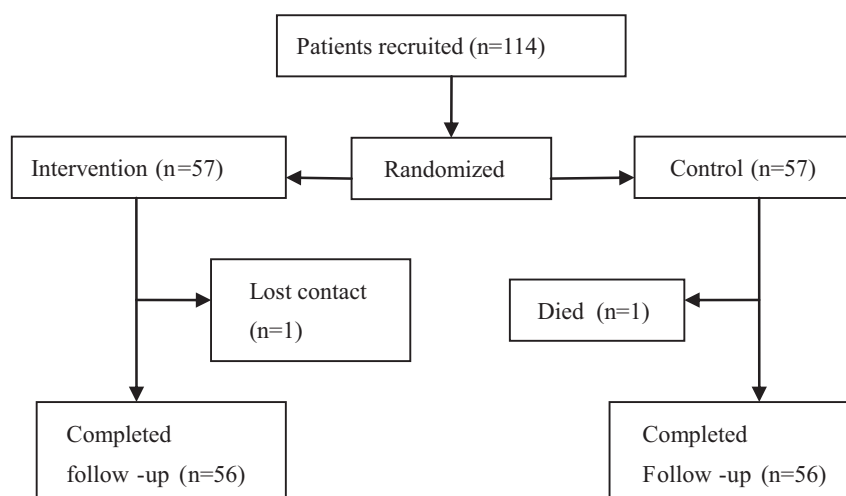


Fig. 1 – Flowchart showing patient participation in study.

disease where patients often experience malnutrition. Nutrition education was offered including diet changes and educating patients on the nutritional impact of COPD. Patients were encouraged to eat a high protein, high fiber, moderate fat, moderate minerals and vitamins, low-carbohydrate, low sugar, salt and the water diet, and adhere to small meal sizes. Psychological support addressed the fact that COPD patients tend to lose confidence in the efficacy of the treatment. Nurses were patient during follow-up discussions and encouraged to talk and listen to the patient's current difficulties; supporting, encouraging, and sharing success stories with patients; and generally increasing the patient's confidence in overcoming the disease.

2.4. Education

Education improves patient and staff cognition of COPD and in turn their ability to deal with the disease resulting in better prevention and treatment, a reduction in repeated exacerbations, and a more stable condition and improved quality of life [6]. Education and instruction ran through entire transitional care plan, including hospitalized health education, health education on discharge day and follow-up health education. Health education consisted of teaching, self-learning and audio-visual aids. Another educational aspect was encouraging and supporting caregivers to participate in the program. This included guiding caregivers to encourage patients to do things within its power to improve patient self-care capabilities, and strengthen the role of patients's status in life. Meanwhile, give the right, practical guidance to the problems the caregiver encountered.

2.5. Outcome measures

The SGRQ assesses health impairment in patients with asthma and COPD [7]. Divided into two parts, it measures (1) symptoms and (2) activity and impact, resulting in a total score. The SGRQ is accepted in the field as a valid, sensitive

and feasible assessment of the quality of life in patients with COPD [8]. The GHQ-12 was scored using a Likert 4 level scoring method with 13 designated as the cut-off point for those with mental disorders, according to previous work [9,10]. Mental disorders included depression and/or anxiety disorders and other mental disorders. BMI was used to assess possible malnutrition based on internationally accepted diagnostic criteria: the normal range of BMI (kg/m^2) is 18.5–23 kg/m^2 = normal; 17–18.4 = mild malnutrition; 16–16.9 kg/m^2 = moderate malnutrition, and <16 kg/m^2 = severe malnutrition [11].

2.6. Statistical analysis

All data from questionnaires were entered into an Epidata database, double checking integrity and rationality again during the entry process. The data was then analyzed using SPSS13.0 statistical software. SGRQ and BMI differences between the intervention and control groups were analyzed using independent t test. The difference of GHQ-12 between the intervention and control groups was analyzed using chi-square test. Level of significance was set at $p < 0.05$.

3. Results

Of the 114 patients we recruited, each 57 were assigned to the intervention group and the control group. Follow-up was completed with 56 patients in the intervention group and also 56 patients in the control group (Fig. 1). Differences in gender, age, educational level, marital status, occupation, economic status, source of medical expenses, smoking status, and severity grading of COPD were not statistically different between the two groups (Table 1). At baseline, the intervention and control groups had similar SGRQ (Table 2), GHQ-12 (Table 3), and BMI (Table 4) scores. SGRQ results demonstrated patients had significant improvements in quality of life, including symptom severity, activity, impact and total scores

Table 1 – Sociodemographic Characteristics of COPF Patients.

Characteristic	Intervention group (n = 56)	Control group (n = 56)	t/χ ²	P
Age, mean years (SD), y	70.91 ± 9.17	72.18 ± 8.53	0.758	0.450
Gender				
Male	49	49		
Female	7	7	0.000	1.000
Marital status, n				
Married	47	51		
Single or Widowed	9	5	1.306	0.253
Level of education, n				
Primary Education or less	17	19		
Lower secondary education	15	21		
High school or secondary education	14	9		
University education or more	10	7	2.727	0.436
Employment status, n				
Retired	55	53		
Employed	1	3	0.259	0.611
Economic level, n				
<1000 yuan/month	8	12		
1000–2000 yuan/month	14	18		
2000–5000 yuan/month	25	22		
>5000 yuan/month	9	4	3.415	0.332
Sources of medical expenses				
Public health	22	20		
Social health insurance	26	19		
Own expense and other	8	7	4.424	0.109
Smoking				
No	6	14		
Yes	5	4		
Quit	45	38	3.901	0.142
Current social situation, n				
Living alone	5	2		
Living with relatives	51	54	0.610	0.435
Severity of COPD				
Moderate	8	16		
Severe	29	21		
Very severe	19	19	3.947	0.139

(Table 2) and improvements in mental status (Table 3). No changes were noted in patients' nutritional status based on no differences in observed BMI (Table 4).

4. Discussion

4.1. Effects of transitional care on the quality of life among COPD patients

Individuals diagnosed with COPD, in general, have a decreased quality of life. The most evident impediment is activity, followed by social and psychological disorders

directly attributable to decreased airflow [12]. In mainland of China, when admitted to the hospital with acute exacerbation of COPD symptoms, patients are often discharged and returned home directly after remission with a lack of continuing health care. Transitional care, either as holistic or extended hospital care, offers pulmonary rehabilitation after hospital discharge. Repeated and targeted health education programs can also improve the patient's awareness of the disease. In this study, nurses closely monitored and guided patients during a follow-up period to complete the pulmonary rehabilitation content, delaying continued decline in lung function, and ultimately improve patients' quality of life. SGRQ is a valid, sensitive and feasible method of evaluation of

Table 2 – SGRQ results at three-month follow up.

Project	Before intervention				After intervention			
	Intervention group	Control group	t value	P value	Intervention group	Control group	t value	P value
Symptoms	58.28 ± 18.25	63.43 ± 18.13	-1.496	0.137	29.39 ± 16.58	63.29 ± 15.69	-11.114	<0.001
Activities	72.23 ± 19.02	76.95 ± 14.64	-1.472	0.144	47.92 ± 16.51	73.78 ± 14.47	- 8.814	<0.001
Impacts	48.52 ± 19.83	53.38 ± 18.16	-1.352	0.179	27.23 ± 13.00	59.68 ± 15.84	-11.848	<0.001
Total score	57.33 ± 16.81	62.19 ± 15.56	-1.590	0.115	33.86 ± 12.68	64.55 ± 14.14	-12.093	<0.001

Values shown as median ± standard deviation.

Table 3 – Incidence of mental disorders at three-month follow up.

Group	Before intervention				After intervention			
	(+)	(–)	χ^2 value	P value	(+)	(–)	χ^2 value	P value
Intervention	38 (67.90)	18 (32.10)	0.700	0.403	3 (5.40)	53 (94.60)	79.120	<0.001
Control	42 (75.00)	14 (25.00)			50 (89.30)	6 (10.70)		

Values shown as percentages.

quality of life in patients with COPD in China [13], demonstrating here that COPD patients' quality of life can be significantly improved with post-discharge translational care.

4.2. Effects of transitional care on mental health among patients with COPD

Enhanced communication between nurses and COPD patients, through multiple follow-up, telephone hotline calls, counseling with patience, comfort, encouragement and emotional relaxation exercises, improved patient's awareness of their own negative emotions, and actively mobilized patient's social support, such as family members, relatives and friends. All of these factors increased the psychological satisfaction of patients and established the confidence to overcome the disease. This was demonstrated by a realized significant decrease in mental disorders following post-hospital translational care. Some correlative factors linked to mental disorders have also been linked to COPD diagnoses, including the severity and length of duration of disease, age, social support and family income. In addition, a variety of inflammatory cells in COPD not only can increase the incidence of airway inflammation, but also induce symptoms of depression and anxiety by affecting the brain emotional control area. Finally, common therapies for COPD, including but not limited to corticosteroids, quinolone antibiotics, and aminophylline, can increase depression and anxiety [14]. Anxiety and depression may increase further and expand the variety of somatic symptoms and clinical manifestations, affect a variety of rehabilitation and treatment efficacy during remission, and reduce a patient's quality of life potential ending in patient death [15].

With the changes of medical model, more and more evidence show COPD is both a physical and mental illness [16,17]. Patients must not only bear the pain caused by physical disease, but also several undesirable negative emotions. Yao Haiyan et al. [17], conducting a questionnaire survey of patients aged 60 and over with COPD found that the main undesirable emotions were depression, frustration, guilt, anxiety, irritability, hostility, fear, lack of interest in things around, sensitivity to interpersonal relationship, paranoia and other

personality disorders. In addition, COPD has been linked to a high incidence of mental disorders [12]. A study conducted in 2005 found 65% of patients with anxiety and depressive disorders following a survey of 1334 hospitalized COPD patients. Our results were consistent with these findings, demonstrating the incidence of psychological disorders was 68.50% and 74.10% in the intervention and control groups, respectively.

4.3. Effects of transitional care on nutritional status among patients with COPD

COPD is a wasting disease, where patients are often malnourished with a concurrence of progressive body loss [18]. The incidence of malnutrition in COPD patients is about 60% in China [19]. Our data show that 42.0% of COPD patients exhibited varying degrees of malnutrition. One study revealed the BMI of COPD patients is lower than the normal population and a high correlation with pulmonary function and arterial blood gas, making malnutrition an independent risk factor for poor COPD prognosis [20]. Malnutrition causes a decrease in COPD patient respiratory muscle strength and endurance resulting in a decrease in lung function negatively impacting quality of life. Therefore, medical staffs should pay close attention to intervention and treatment of COPD patients' nutritional status. Interestingly, we did not find a statistically significant correlation between BMI and COPD translational care. One possible explanation is the limitations of a three month follow-up period. Future studies should extend this time frame further in order to properly assess any significant correlations between COPD and malnutrition.

5. Conclusions

Transitional care after hospital discharge can effectively improve a COPD patient's mental condition and the quality of life. The feasibility and effectiveness of a properly implemented transitional care model has also been preliminarily confirmed, and it is worth further study to measure its possible effectiveness in other chronic diseases.

Conflict of interest

The authors declare that they have no conflict of interest.

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Table 4 – BMI and nutritional status at 3 months post discharge.

Group	n	BMI (on admission)	BMI (3 months post discharge)
Intervention	56	19.20 ± 2.37	19.45 ± 2.37
Control	56	19.58 ± 2.63	19.57 ± 2.65
t value		–0.807	–0.261
P value		0.421	0.794

Values are shown as medians and standard deviation.

Appendix

Telephone follow-up records for patients with COPD

Name: _____ Gender: male female Age: _____
 Date : _____ Time : _____
 minutes

Self-introduction: I am the transitional care nurses _____ (name)

Nursing assessment and monitoring	Nursing intervention
<p>1. Symptoms and signs</p> <p>1.1 Increased cough? <input type="checkbox"/>No <input type="checkbox"/>Yes</p> <p>1.2 How about sputum?</p> <p>1.2.1 Increased sputum? <input type="checkbox"/>No <input type="checkbox"/>Yes</p> <p>1.2.2 Any change in sputum color? <input type="checkbox"/>No <input type="checkbox"/>Yes <input type="checkbox"/>Yes: <input type="checkbox"/>Yellow <input type="checkbox"/>Green <input type="checkbox"/>Thick</p> <p>1.3 Has wheezing increased? <input type="checkbox"/>No <input type="checkbox"/>Yes_____</p> <p>1.4 How long the symptoms have changed? _____hours/day</p> <p>1.5 See a doctor? <input type="checkbox"/>No <input type="checkbox"/>Yes _____ Whether to take back drugs? <input type="checkbox"/>No <input type="checkbox"/>Yes_</p>	<p>Health education, guidance and counseling:</p> <p><input type="checkbox"/>Taking hormone according to prescription</p> <p><input type="checkbox"/>Taking antibiotics according to prescription</p> <p><input type="checkbox"/>Effective cough and sputum</p> <p><input type="checkbox"/>The method used to reduce wheezing</p> <p><input type="checkbox"/>Continue to monitor changes in symptoms, see a doctor when symptoms worsen</p> <p><input type="checkbox"/>Call the hotline at any needs</p> <p>Case management:</p> <p><input type="checkbox"/>Medical referral:</p> <p><input type="checkbox"/>Community doctors <input type="checkbox"/>Outpatient</p> <p><input type="checkbox"/>Emergency</p>
<p>2. Complications or new symptoms</p> <p>2.1 Body temperature? <input type="checkbox"/>Normal <input type="checkbox"/>Fever____°C Any other discomfort? <input type="checkbox"/>No <input type="checkbox"/>Yes_____</p> <p>2.2 Lower extremity edema? <input type="checkbox"/>No<input type="checkbox"/>Yes Or increase? <input type="checkbox"/>No<input type="checkbox"/>Yes</p> <p>2.3 Chest tightness? <input type="checkbox"/>No<input type="checkbox"/>Yes</p> <p>2.4 Are there any other physical discomfort? <input type="checkbox"/>No <input type="checkbox"/>Yes _____</p>	<p>Health education, guidance and counseling:</p> <p><input type="checkbox"/>Body temperature 38.8 °C or above for 48 hours, see a doctor</p> <p><input type="checkbox"/>Limits on water</p> <p>Case management:</p> <p><input type="checkbox"/>Medical referral:</p> <p><input type="checkbox"/>Community doctors <input type="checkbox"/>Outpatient</p> <p><input type="checkbox"/>Emergency Monitoring:</p> <p><input type="checkbox"/>Measured 24 hours urine output</p>
<p>3. Psychosocial</p> <p>3.1 Participate in some social activities? <input type="checkbox"/>No <input type="checkbox"/>Yes</p> <p>3.2 Mental status? Depression: <input type="checkbox"/>No<input type="checkbox"/>Yes Feeling down: <input type="checkbox"/>Yes <input type="checkbox"/>No: Reasons: _</p>	<p>Health education, guidance and counseling:</p> <p><input type="checkbox"/>Appreciation, encourage</p> <p><input type="checkbox"/>To educate and guide based on the problems' reason: _____</p>
<p>4. Family rehabilitation</p> <p>4.1 Adhere to daily walk / stair based on the agreed program? <input type="checkbox"/>Yes <input type="checkbox"/>No: Reasons: _____</p> <p>4.2 Adhere to upper limb movements based on the agreed program? <input type="checkbox"/>Yes <input type="checkbox"/>No: Reasons: _____</p> <p>4.3 Adhere to daily self-relaxation exercises based on the agreed program? <input type="checkbox"/>Yes <input type="checkbox"/>No: Reasons: _____</p> <p>4.4 Physical discomfort during exercise? <input type="checkbox"/>No <input type="checkbox"/>Yes</p>	<p>Health education, guidance and counseling:</p> <p><input type="checkbox"/>Appreciation, encourage</p> <p><input type="checkbox"/>To educate and guide based on the problems' reason: _____</p> <p>Treatment and procedures:</p> <p><input type="checkbox"/>Agreement to adjust the next action plan</p> <p>Case management:</p> <p><input type="checkbox"/>Care referral <input type="checkbox"/>Consulting therapist</p> <p>Monitoring:</p> <p><input type="checkbox"/>Telephone/ <input type="checkbox"/>home visits: Date _____</p>

Telephone follow-up records for patients with COPD

Nursing assessment and monitoring	Nursing intervention
<p>5. Health behaviors</p> <p>5.1 Taking medicine by prescription? <input type="checkbox"/>Yes <input type="checkbox"/>No: Reasons: _____</p> <p>5.2 Effects of medication? Side effects: <input type="checkbox"/>No<input type="checkbox"/>Yes_____</p> <p>5.3 If there is any use of wheezing inhalation medication? <input type="checkbox"/>Yes<input type="checkbox"/>No Dosage_____spray / time? time/day</p> <p>5.4 The method used to reduce wheezing? <input type="checkbox"/>Yes <input type="checkbox"/>No: Reasons: _____</p> <p>5.5 Whether the use of daily activities with breathing (shrink lip breathing)? <input type="checkbox"/>Yes <input type="checkbox"/>No: Reasons: _____</p> <p>5.6 Oxygen_____hours/day (If needed)? If not, Reasons: _____</p> <p>5.7 How diet?</p> <p>5.8 How sleep and rest?</p> <p>5.9 Quit smoking based on the agreed plan? (As appropriate) <input type="checkbox"/>Yes <input type="checkbox"/>No: Reasons: __</p> <p>5.10 Daily oxygen by prescription? <input type="checkbox"/>Yes <input type="checkbox"/>No: Reasons: _____</p>	<p>Health education, guidance and counseling:</p> <p><input type="checkbox"/>Appreciation, encourage</p> <p><input type="checkbox"/>To educate and guide based on the problems' reason: _____ _____</p> <p>Treatment and procedures:</p> <p>Follow-up skills : <input type="checkbox"/>Methods to reduce wheezing <input type="checkbox"/>Drug inhalation technique <input type="checkbox"/>Breath with daily activities</p> <p>Case management:</p> <p><input type="checkbox"/>Care referral <input type="checkbox"/>Medical referral (Serious drug side effects)</p> <p>Monitoring:</p> <p><input type="checkbox"/>Drug side effects</p>
<p>6. Environment</p> <p>6.1 Have the home environmental risk factors been changed after the first visit? <input type="checkbox"/>Yes<input type="checkbox"/>No: Reasons: _____</p>	<p>Health education, guidance and counseling:</p> <p><input type="checkbox"/>To educate and guide based on the problems' reason: _____</p>

Special care needs or considerations:

At the end of encouraging words: Chronic obstructive pulmonary disease is chronic, not easy to handle, I will then call you next week, or come visit you. If you have some things you want to do to improve your health, we can work together to set goals, let me give you a cheer, I will follow up with you in the next time.

Common goals:

Goal	Content	Goal	Content
1		3	
2		4	

Ask patients about the most appropriate time telephone visit Time: _____

Call our hotline with any question: _____, goodbye! Signature: _____

Discharged care prescription for patient with COPD

Tick in the appropriate project:

- Walk: _____ minute / time _____ time / day _____ day/week
- Boarding ladder: _____ minute / time _____ time / day _____ day/week
- Upper limb movement: _____ minute / time _____ time / day _____ day/week
- Self-relaxation: _____ minute / time _____ time / day _____ day/week
- Pursed lip breathing: _____ minute / time _____ time / day _____ day/week
- Abdominal breathing: _____ minute / time _____ time / day _____ day/week
- Prescribed home oxygen therapy: compressed oxygen Oxygen generator
 _____ L/minute _____ hours/day
- Others: _____

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