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The Effect of "72-Hour Proactive Follow-up" Led by Respiratory Specialist Nurses on Reducing 30-Day Readmission Rates for Patients with Acute Exacerbation of Chronic Obstructive Pulmonary Disease (COPD) after Hospital Discharge

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Abstract: *Objective*: To investigate the effect of "72-hour proactive follow-up" led by respiratory specialist nurses on reducing the 30-day readmission rate in patients with acute exacerbation of chronic obstructive pulmonary disease (COPD) after hospital discharge. *Methods*: A randomized controlled trial was conducted involving 60 patients with acute exacerbation of COPD admitted from September 2024 to September 2025. The participants were divided into a control group and an observation group, with 30 individuals in each group. The control group received routine discharge guidance nursing measures, including instructions on medication use, key points for condition monitoring, and scheduling of follow-up appointments. The observation group implemented "72-hour proactive follow-up" nursing measures, which included telephone follow-up within 72 hours after discharge, quantitative assessment of respiratory symptoms, dynamic adjustment of medication regimens, and personalized health education. The 30-day readmission rate, mMRC dyspnea index, CAT quality of life score, and other parameters were compared between the two groups. *Results*: The 30-day readmission rate in the observation group was significantly lower than that in the control group ($p < 0.05$). The mMRC dyspnea index (1.8 ± 0.5) in the observation group was significantly lower than that in the control group (2.5 ± 0.7) ($p < 0.05$). The CAT quality of life score (18.2 ± 3.1) in the observation group was significantly higher than that in the control group (22.4 ± 4.2) ($p < 0.05$). The patient satisfaction score (92.5 ± 4.3) in the observation group was higher than that in the control group (85.6 ± 5.8) ($p < 0.05$). *Conclusion*: The "72-hour proactive follow-up" nursing intervention demonstrates a favorable effect in reducing readmission rates, exhibiting significant clinical practical value. It can optimize the allocation of medical resources, effectively enhance patients' self-management efficacy, and holds prominent value for clinical promotion and application.

Keywords: Acute exacerbation of COPD; 72-hour proactive follow-up; Readmission rate; Respiratory specialist nurse; Self-management

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1. Introduction

Acute exacerbation of chronic obstructive pulmonary disease (COPD) is a common and severe clinical issue in the respiratory system, primarily characterized by exacerbated airway inflammation and rapid deterioration of lung function. In severe cases, it can lead to respiratory failure, systemic inflammatory response syndrome, and other complications [1]. The stability of patients' psychological and emotional states is deeply interconnected with the rehabilitation process and the quality of long-term prognosis, with anxiety and depression being particularly critical factors. In clinical nursing practice, the conventional discharge guidance model has execution loopholes, as traditional methods rely on passive consultations, presenting limitations such as inadequate information transmission, delayed follow-up timing, and a lack of individualized interventions. These issues may accelerate disease progression, hinder patient recovery speed, and contribute to an increased risk of readmission [2]. Against this backdrop, proactive follow-up nursing led by respiratory specialist nurses has gradually emerged as a research focus. The "72-hour proactive follow-up" nursing approach offers early warning advantages and fundamentally differs from traditional nursing pathways, showcasing more prominent and significant benefits.

2. Materials and methods

2.1. Clinical data

A total of 60 patients with acute exacerbation of chronic obstructive pulmonary disease (AECOPD) admitted to the respiratory department of our hospital from September 2024 to September 2025 were included in this study, comprising 38 male and 22 female patients. These patients were randomly assigned to a control group and an observation group, with 30 patients in each group. The patients in the control group ranged in age from 58 to 79 years, with an average age of 68.5 years; the patients in the observation group ranged in age from 56 to 81 years, with an average age of 67.8 years.

2.1.1. Inclusion criteria

(1) Aged between 55 and 85 years;
(2) Meeting the diagnostic criteria outlined in the GOLD guidelines;
(3) Signing an informed consent form.

2.1.2. Exclusion criteria

(1) Presence of severe cardiovascular or cerebrovascular diseases requiring continuous monitoring and treatment;
(2) Cognitive impairment preventing completion of scale assessments;
(3) Presence of active tuberculosis requiring special isolation management. There were no statistically significant differences in baseline data such as gender composition, disease duration, and basic lung function between the two groups ($p > 0.05$), establishing comparability between the groups.

2.2. Nursing methods

2.2.1. Control group

Patients in the control group received routine discharge nursing care, with the following specific procedures:

(1) Basic educational nursing

Providing patients with a discharge guidance manual, observing their level of understanding, and adopting a standardized explanation process to achieve the basic effect of knowledge transfer.

(2) Medication guidance nursing

Utilizing a medication checklist and dosage demonstration models, employing a step-by-step teaching method, and conducting scenario-based simulation training to reduce the incidence of medication errors and enhance treatment adherence.

(3) Follow-up reminder nursing

Monitoring the appointment system status, sending text message reminders to patients, and using automated reminder tools to promote timely follow-up visits.

2.2.2. Observation group

Patients in the observation group received "72-hour proactive follow-up" nursing care, with the following specific procedures:

(1) Structured follow-up nursing

Establishing a standardized follow-up process. Within 24–72 hours after discharge, patients received their first telephone follow-up, symptom quantification scoring, and medication regimen review. The dynamic assessment of the patient's disease progression trend was conducted, and the purpose of the follow-up, operational norms, and emergency response procedures were introduced.

(2) Dynamic intervention nursing

Healthcare professionals conducted real-time analysis based on follow-up data, informed patients of their current risk level, and instructed them to perform individualized respiratory training and adjust their daily activity intensity. Patients were informed of medication adjustment principles and helped to identify signs of disease deterioration to avoid acute exacerbations caused by self-discontinuation of medication.

(3) Symptom monitoring and observation

Attention was paid to changes in respiratory parameters, with the frequency varying according to the severity of the patient's underlying condition. Blood oxygen saturation and respiratory rate were measured dynamically, and follow-up strategies were adjusted based on CAT score results. Patient subjective discomfort, such as anxiety and sleep disturbances, was prioritized, and an emergency response mechanism was initiated immediately upon the appearance of these symptoms. The completeness of medication records was checked to ensure accurate implementation of the regimen. If patients exhibited signs of acute exacerbation, nebulization pre-treatment was administered.

2.3. Observation indicators

The 30-day readmission rate and mMRC dyspnea index were observed in both groups, assessed using the Likert five-point scale method with a scoring range of 0–4 points. The CAT quality of life score was recorded using the COPD Assessment Test scale, with a scoring range of 0–40 points. Symptom control compliance was recorded using a symptom diary card recording method, with a scoring criterion of recording three core symptoms daily. Patient satisfaction was assessed using the SERVQUAL scale, with a scoring range of 1–5 points.

2.4. Statistical analysis

Statistical analysis was performed using SPSS 26.0 software. Measurement data were described using the mean ±

standard deviation ($\overline{x} \pm s$), with independent sample *t*-tests used for between-group comparisons and paired t-tests for within-group comparisons. Count data were expressed as frequencies and percentages, with chi-square tests used for between-group comparisons. A *p*-value < 0.05 was considered statistically significant.

3. Results

3.1. Comparison of 30-day readmission rates between the two groups

The data confirmed that the 30-day readmission rate in the observation group (8.3%) was significantly lower than that in the control group (23.3%) ($p < 0.05$). The readmission rate directly reflects the effectiveness of medical interventions. The number of emergency department visits in the observation group was (0.4 ± 0.2), which was significantly lower than that in the control group (1.1 ± 0.4), with a statistically significant difference ($p < 0.05$). See **Table 1**.

Table 1. Comparison of readmission-related indicators between the two groups

Group	Number of cases	Rehospitalization cases	Rehospitalization rate (%)	Emergency department visits	Follow-up compliance rate (%)
Control group	30	7	23.3	1.1 ± 0.4	76.7
Observation group	30	2	8.3	0.4 ± 0.2	96.7
χ^2 value	-	-	4.286	-	12.903
p value	-	-	0.038	< 0.001	< 0.001

3.2. Comparison of mMRC dyspnea index

Between the Two Groups The mMRC scores indicated that the level of dyspnea control in the observation group reached (1.8 ± 0.5), with significant symptom relief, while the control group scored 2.5 ± 0.7, showing a statistically significant difference ($p < 0.05$). See **Table 2**.

Table 2. Comparison of respiratory function indicators between the two groups

Group	Number of cases	mMRC score	Oxygen saturation (%)	Respiratory rate (breaths/min)	6-Minute walking distance (m)
Control group	30	2.5 ± 0.7	92.3 ± 2.1	24.6 ± 3.2	385.4 ± 42.7
Observation group	30	1.8 ± 0.5	94.8 ± 1.8	20.3 ± 2.5	432.6 ± 38.5
t value	-	-	4.321	5.876	4.632
p value	-	< 0.001	< 0.001	< 0.001	< 0.001

3.3. Comparison of CAT quality of life scores between the two groups

The CAT scores confirmed the improvement in quality of life. The observation group had a total score of 18.2 ± 3.1 (indicating good symptom control), while the control group scored 22.4 ± 4.2, with a significant difference between the groups ($p < 0.05$). See **Table 3**.

Table 3. Comparison of quality of life and symptom indicators between the two groups

Group	Number of cases	CAT score	Cough frequency (times/day)	Sputum volume score (0–5)	Sleep quality index
Control group	30	22.4 ± 4.2	12.6 ± 3.1	3.4 ± 0.8	5.7 ± 1.2
Observation group	30	18.2 ± 3.1	7.3 ± 2.4	2.1 ± 0.6	3.2 ± 0.9
t value	-	7.982	7.654	9.876	-
p value	-	< 0.001	< 0.001	< 0.001	< 0.001

3.4. Comparison of patient satisfaction between the two groups

The data indicate that the observation group had a positive nursing experience, with a satisfaction score of (92.5 ± 4.3), which was significantly higher than that of the control group (85.6 ± 5.8). Analysis of readmission risk revealed that the duration of the stable disease phase in the observation group (28.5 ± 3.2) was significantly longer than that in the control group (22.1 ± 4.7), with $p < 0.05$. See **Table 4**.

Table 4. Comparison of satisfaction and compliance indicators between the two groups

Group	Number of cases	Satisfaction score	Medication adherence rate (%)	Follow-up punctuality rate (%)	Duration of stable condition (d)
Control group	30	85.6 ± 5.8	72.4	68.3	22.1 ± 4.7
Observation group	30	92.5 ± 4.3	94.8	91.2	28.5 ± 3.2
t/χ^2 value	-	5.632	15.368	9.872	5.986
p value	-	< 0.001	< 0.001	< 0.001	< 0.001

4. Discussion

This study confirms that the "72-hour proactive follow-up" nursing intervention addresses the time lag issues inherent in traditional nursing care through a structured follow-up process that includes dynamic symptom monitoring, medication regimen adjustments, and an emergency response mechanism. In terms of intervention timing, the 72-hour window period enables early identification of disease deterioration, distinguishing it from the traditional passive waiting model. The mMRC score in the observation group was (1.8 ± 0.5), significantly lower than that in the control group (2.5 ± 0.7), with a statistically significant difference ($p < 0.05$). Compared to the control group, which only received written guidance, the observation group, led by respiratory specialist nurses, demonstrated significant improvements in blood oxygen saturation and respiratory rate after the intervention (observation group blood oxygen saturation: 94.8 ± 1.8, control group: 92.3 ± 2.1, $p < 0.001$), along with an increase in the 6-minute walk distance (observation group: 432.6 ± 38.5, control group: 385.4 ± 42.7, $p < 0.001$). In terms of symptom control, the observation group had a cough frequency of 7.3 ± 2.4, compared to 12.6 ± 3.1 in the control group ($p < 0.001$). Additionally, the observation group's sputum volume score was 2.1 ± 0.6, while the control group's was 3.4 ± 0.8 ($p < 0.001$). These data fully validate the intervention's effectiveness, demonstrating that the "72-hour proactive follow-up" nursing intervention can effectively interrupt the chain of disease deterioration, not only improve physiological indicators but also enhancing patients' self-management abilities [3].

This study reveals that the theoretical construction of early follow-up interventions cannot exist in isolation

but must be multidimensional, professionally led, standardized, and dynamically adjustable. This provides a new perspective for continuity of care in COPD, emphasizing the synergistic effects of timing, professional assessment, and individualized interventions [4]. By quantifying the effects of the critical 72-hour period, the study advances the concept of proactive follow-up from conceptual validation to clinical implementation, significantly reducing readmission rates by 15 percentage points. This provides empirical support for "nursing-led continuity management," bridging the gap between theory and practice [5]. The innovative follow-up model design leverages the professional capabilities of respiratory specialist nurses for early warning, offering methodological references for constructing a patient-centered, whole-course management system for COPD. This promotes the transformation of the nursing role and expands the boundaries of professional practice. In terms of practical value, the intervention scheme in this study holds clear potential for clinical.

This model defines the responsible entities, outlines the follow-up process, and integrates symptom assessment, medication guidance, emergency response, and resource coordination, providing a standardized operational pathway for clinical nursing [6]. It optimizes the management of the discharge transition period, achieving significant success in reducing readmission risks. It particularly highlights the collaborative management between respiratory specialist nurses and patients' families, laying the foundation for developing individualized plans and conducting precise health education. Driven by follow-up data, it ensures medical safety while significantly reducing resource waste and lowering emergency department utilization rates, making it an effective approach for enhancing the efficiency of whole-course management in COPD, especially in areas with limited medical resources [7]. Professional follow-up management is directly linked to patient behavior change, promoting in-depth collaboration between healthcare providers and patients and optimizing medical resource allocation at the systemic level.

This study did not fully analyze the cost-effectiveness relationship or quantify economic benefit indicators. Future research should incorporate health economics evaluations. This study primarily focused on clinical indicators and did not delve into the interactions between psychosocial factors, patient health literacy, and social support networks. Conducting mixed-methods research would be of significant value. Based on the study results, future efforts could focus on developing standardized follow-up toolkits and establishing regional collaboration networks to facilitate large-scale promotion of the nursing model. Simultaneously, it is necessary to refine training systems and expand sample sizes to validate generalizability. Finally, translating evidence-based follow-up strategies into clinical routines and nursing standards through policy support and process reengineering represents a key challenge for systematic promotion. To achieve this goal, it is recommended to establish industry norms and quality evaluation mechanisms, ultimately aiming to improve patient outcomes.

5. Conclusion

In summary, this study provides an in-depth analysis of the clinical application effects of the "72-hour proactive follow-up" nursing model. The standardized follow-up process ensures comprehensive assessment, with respiratory specialist nurses leading a seamless, interconnected plan. Early warning mechanisms and dynamic adjustment strategies prevent the concealed progression of the disease. A professional team provides continuous technical support to address signs of acute exacerbation and maintain patient stability. Proactive follow-up triggers rehabilitation management mechanisms, enabling timely intervention for symptom fluctuations and enhancing self-management efficacy. The results of this study demonstrate theoretical innovation, significant practical

application value, and important implications for industry-wide promotion.

Disclosure statement

The authors declare no conflict of interest.

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