Journal of Clinical and Nursing Research, 2025, Volume 9, Issue 2
http://ojs.bbwpublisher.com/index.php/JCNR
Online ISSN: 2208-3693
Print ISSN: 2208-3685

Analysis of the Effect of Continuous Nursing Pathway on Improving the Accuracy of Aerosol Use in Elderly Patients with Chronic Obstructive Pulmonary Disease

Jiao Chen†, Chuo Guo†, Yaran Li*

Third Ward, Department of Respiratory and Critical Care Medicine, Hebei University Affiliated Hospital, Baoding 071000, Hebei Province, China
†These authors contributed equally to this work and shared the first authorship.

***Corresponding author:** Yaran Li, 347022098@qq.com

Abstract: *Objective:* To explore nursing measures for elderly patients with chronic obstructive pulmonary disease (COPD) and analyze the effect of continuous nursing pathways on improving the accuracy of aerosol use. *Methods:* From April 2023 to April 2024, 76 elderly COPD patients admitted to our hospital were randomly selected for nursing research. They were divided into two groups using a computer double-blind method, with 38 patients in each group. The control group received routine nursing, while the observation group applied the continuous nursing pathway. The nursing effects of the two groups were investigated and compared, including (1) aerosol accuracy; (2) cardiopulmonary function; (3) subjective well-being and self-care ability; (4) quality of life; and (5) nursing satisfaction. *Results:* Compared with the control group, the observation group had a significantly higher accuracy rate of aerosol use ($P < 0.05$). Before nursing, there were no significant differences in cardiopulmonary function indicators, MUNSH scores, and ESCA scores between the two groups ($P > 0.05$). After nursing, the patient's cardiopulmonary function improved significantly, and their subjective well-being and self-care ability increased. The observation group was significantly better than the control group in all the above indicators ($P < 0.05$). The quality of life scores of the observation group were significantly higher than those of the control group ($P < 0.05$). *Conclusion:* In the nursing of elderly patients with chronic obstructive pulmonary disease, the application of the continuous nursing pathway can effectively improve the accuracy of aerosol use and improve patients' cardiopulmonary function.

Keywords: Continuous nursing pathway; Chronic obstructive pulmonary disease; Aerosol; Accuracy rate

Online publication: March 6, 2025

1. Introduction

Chronic obstructive pulmonary disease (COPD) is a common clinical respiratory disease, which is a multiple

disease of the elderly population and affects multiple organ systems of patients, posing a significant threat to their lives and health. In addition, the disease has the characteristic of recurrent episodes, so nursing intervention for patients is particularly important. As a widely used nursing model in recent years, the continuous nursing pathway can extend nursing services from the hospital to outside the hospital, allowing patients to continue to receive targeted and high-quality nursing guidance at home after discharge. This ensures that patients use aerosols correctly, effectively stabilizes their condition, and significantly improves their self-care ability and quality of life [1]. Therefore, this article conducts nursing research on 76 elderly COPD patients admitted to the hospital in recent years, aiming to explore the application effect of the continuous nursing pathway and its impact on the accuracy of aerosol use by patients. The following report was made.

2. Materials and methods

2.1. General information

From April 2023 to April 2024, 76 elderly patients with COPD admitted to the hospital were studied. They were divided into two groups using a computer-generated double-blind method. In the control group, there were 38 patients, including 20 males and 18 females, with an age range of 66 to 82 years old and an average age of (71.53 ± 4.33) years old. The duration of the disease ranged from 1 to 11 years, with an average of (7.02 ± 2.54) years. In the observation group, there were also 38 patients, with a male/female ratio of 19:19. The age range was 65 to 83 years old, with an average age of (70.92 ± 4.34) years old. The duration of the disease ranged from 1.5 to 10.5 years, with an average of (7.36 ± 2.61) years. After analyzing the clinical baseline data of the two groups, there were no significant differences in age, gender, and duration of the disease, indicating comparable research value ($P > 0.05$). The hospital ethics committee approved the implementation of the research project. Inclusion criteria: All selected patients met the diagnostic criteria for chronic obstructive pulmonary disease; were over 60 years old; and both the patients and their families were fully informed about the study, volunteered to participate, and signed informed consent forms. Exclusion criteria: Patients with severe organic diseases such as heart, liver, and kidney diseases; diabetes mellitus; bronchiectasis; severe mental abnormalities or cognitive impairments; malignant tumor lesions; poor compliance; incomplete clinical data, etc., were excluded from the study.

2.2. Methods

Routine care was provided to patients in the control group. This included guidance on the use of aerosols, informing them of relevant precautions, and conducting health education and discharge guidance.

Patients in the observation group received continuous nursing care with the following specific measures:

(1) Formation of a COPD nursing team consisting of 1 head nurse, 1 doctor, and 4 nursing staff. The head nurse served as the team leader and provided professional training to the team members. Only those who passed the assessment were allowed to work, ensuring that the nursing staff mastered the relevant content and operating procedures of continuous nursing care [2].

(2) Health education: Nursing staff distributed health knowledge manuals to patients, patiently answered questions raised by patients and their families, organized regular health lectures to strengthen patients' awareness of the disease, and provided guidance on the correct use of aerosols.

(3) Follow-up intervention: In the first month after discharge, nursing staff conducted weekly telephone follow-ups. In the second month, follow-ups were conducted every two weeks, and from the third month

onward, follow-ups were conducted monthly for a total of 6 months. During the follow-up period, the nursing staff assessed the patient's recovery status, daily life and behaviors, and aerosol usage to provide timely guidance on any errors, especially advising patients who smoke or consume alcohol excessively. They also provided guidance on healthy eating and exercise [3–5].

(4) Establishment of a WeChat group: Nursing staff created a WeChat group for patients to occasionally share methods of disease care, introduce the correct use of aerosols through videos and graphics, and provide real-time answers to patients' questions to continuously improve their self-care abilities [6].

(5) Home visits: Based on the specific conditions of patients, nursing staff provided one home visit service to assess the patient's aerosol usage, identify any deficiencies or issues, and check their daily diet, medication, and exercise. Individualized guidance was provided based on the patient's condition. During the home visit, the nursing staff also paid attention to identifying and addressing any potential problems the patient may have [7]

2.3. Observation Indices

(1) Observation of Aerosol Usage: Based on the follow-up of the two patient groups, the correct usage rate of the aerosol will be recorded and calculated.

(2) Observation of Cardiopulmonary Function: Lung function testers will be used to examine FEV1 (Forced Expiratory Volume in the first second) and PEF 50% (Peak Expiratory Flow at 50% of lung capacity) for both patient groups. The test values will be accurately recorded. Additionally, echocardiography will be performed to measure EF (Ejection Fraction) for both groups, before and after nursing care.

(3) Observation of Subjective Well-being and Self-care Ability: Before and after nursing care, subjective well-being will be evaluated using the MUNSH (Memorial University of Newfoundland Scale of Happiness) on a scale of 0–50 points. Self-care ability will be assessed using the ESCA (Exercise of Self-Care Agency Scale) on a scale of 0–180 points. Scores will be accurately recorded for both groups, with higher scores indicating higher subjective well-being and self-care ability.

(4) Observation of Quality of Life: Referring to the GQOL-74 (Generic Quality of Life Inventory-74) scale, patients from both groups will be evaluated in four aspects: psychological function, social function, physical status, and material function. Each aspect will be scored on a scale of 0–100, with higher scores indicating a higher quality of life.

2.4. Statistical Analysis

Statistical analysis of the research data will be performed using SPSS 23.0. For comparison of measurement data, the *t*-test will be used, and the data will be described in the form of mean ± standard deviation (SD). For comparison of enumeration data, the chi-squared test (χ^2) will be applied, and the correct usage rate of the aerosol will be described in the form of (*n*, %). Statistical significance will be determined at $P < 0.05$.

3. Results

3.1. Comparison of correct usage rate of aerosol between two groups

As shown in **Table 1** below, the correct usage rate of aerosol in the observation group was significantly higher than that in the control group ($P < 0.05$).

Table 1. Comparison of correct usage rate of aerosol between two groups

Group	Number of cases (*n*)	Correct (*n*)	Incorrect (*n*)	Correct rate (%)
Observation group (*n*)	38	36	2	94.74
Control group (*n*)	38	26	12	68.42
χ^2 value	-	-	-	12.067
P value	-	-	-	< 0.05

3.2. Comparison of cardiopulmonary function indices between two groups

Through cardiopulmonary function testing of patients in both groups, the data shown in **Table 2** indicates that there were no significant differences in FEV1, PEF50%, and EF before nursing intervention ($P > 0.05$). However, after the nursing intervention, the cardiopulmonary function of patients in both groups improved significantly, and the observation group showed better improvement in all indices compared to the control group ($P < 0.05$).

Table 2. Comparison of cardiopulmonary function between two groups

Group	Number of cases (*n*)	FEV1 (L)		PEF 50% (L/s)		EF (%)	
		Before nursing	After nursing	Before nursing	After nursing	Before nursing	After nursing
Observation group (*n*)	38	1.28 ± 0.16	3.24 ± 0.28	1.07 ± 0.24	1.98 ± 0.34	62.65 ± 2.61	73.46 ± 3.71
Control group (*n*)	38	1.25 ± 0.19	2.39 ± 0.21	1.11 ± 0.22	1.75 ± 0.27	62.63 ± 2.58	68.45 ± 2.55
T value	-	0.284	17.261	0.207	4.737	0.039	7.876
P value	-	> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05

3.3. Comparison of subjective well-being and self-care ability between the two groups

Both groups of patients underwent MUNSH and ESCA assessments. The results in **Table 3** show no statistically significant difference in the two scores between the two groups before nursing intervention ($P > 0.05$). However, after the nursing intervention, the patient's subjective well-being and self-care ability improved significantly. The observation group had higher scores compared to the control group ($P < 0.05$).

Table 3. Comparison of MUNSH and ESCA scores between the two groups [(mean ± SD), points]

Group	Number of cases (n)	MUNSH		ESCA	
		Before nursing	After nursing	Before nursing	After nursing
Observation group (*n*)	38	28.93 ± 4.22	40.66 ± 2.98	110.94 ± 10.59	158.98 ± 15.25
Control group (*n*)	38	29.09 ± 4.31	33.26 ± 3.19	111.22 ± 11.01	125.96 ± 12.61
T value	-	0.163	13.922	0.338	13.645
P value	-	> 0.05	< 0.05	> 0.05	< 0.05

3.4. Comparison of Quality of Life Between the Two Groups

According to the assessment using the GQOL-74 scale, as shown in **Table 4**, there are significant differences in scores between the two groups, with the observation group scoring significantly higher than the control group ($p < 0.05$).

Table 4. Comparison of GQOL-74 scores between the two groups [(mean ± SD), points]

Group	Number of cases (*n*)	Psychological function	Social function	Physical status	Material function
Observation group (*n*)	38	84.14 ± 1.63	78.33 ± 1.08	80.12 ± 1.56	83.32 ± 1.44
Control group (*n*)	38	69.99 ± 1.04	66.21 ± 1.03	69.03 ± 1.07	66.25 ± 1.09
T value	-	12.021	11.945	10.096	11.271
P value	-	< 0.05	< 0.05	< 0.05	< 0.05

4. Discussion

Currently, aerosol inhalation therapy stands as the preferred treatment approach for elderly patients with chronic obstructive pulmonary disease (COPD), aiming to alleviate their clinical symptoms. However, a significant number of these patients transition to home-based care after discharge, where they often encounter difficulties with appropriate dosing and correct administration techniques of aerosols. Such improper usage not only undermines the therapeutic effectiveness but also potentially exacerbates the patient's condition. Therefore, it becomes clinically imperative to provide effective nursing guidance services to support patients' recovery [9].

Conventional nursing practices typically focus on inpatient care, including health education, instructions on aerosol usage, and precautionary measures. Despite these efforts, the correct usage rate of aerosols among patients remains relatively low. The continuous nursing pathway emerges as a novel care model that extends beyond the hospital stay, ensuring patients continue to receive standardized nursing guidance and services. This model incorporates various strategies like telephone follow-ups, regularly scheduled health lectures, and the dissemination of health information through online platforms. These approaches enable timely monitoring of patients' condition changes, and identification of errors in aerosol usage, and unhealthy behaviors, allowing for individualized and targeted corrections. Notably, during home visits, nurses can provide hands-on demonstrations and guidance, enhancing patients' mastery of correct aerosol administration techniques and subsequently improving their self-care abilities [10].

According to the study data presented here, the observation group demonstrated a significantly higher rate of correct aerosol usage compared to the control group ($P < 0.05$). This finding underscores the effectiveness of the continuous nursing pathway in extending care beyond the hospital setting, facilitating patients' accurate use of aerosols to manage their condition. Furthermore, while there were no significant differences in cardiopulmonary function, subjective well-being, and self-care ability scores between the two groups before nursing intervention ($P > 0.05$), the post-intervention data revealed significant improvements in all these indicators, with the observation group performing better than the control group. Additionally, the observation group exhibited higher scores in various aspects of quality of life compared to the control group ($P < 0.05$). These results suggest that the continuous nursing pathway not only enhances patients' self-care abilities but also stabilizes their cardiopulmonary function indicators, leading to improved quality of life.

5. Conclusion

In summary, the implementation of the continuous nursing pathway in elderly patients with COPD effectively increases the correct usage rate of aerosols, significantly improves patients' cardiopulmonary function and quality

of life, and strengthens their self-care abilities. This approach holds promise for widespread clinical application.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Huang S, Dai Q, Wen L, et al., 2024, Study on the Effect of Implementing Continuous Nursing Intervention on Lung Function and Quality of Life of Elderly Patients with Chronic Obstructive Pulmonary Disease. Journal of Chronic Diseases, 25(2): 275–278.

[2] Li J, Li Q, 2023, The Effect of Continuous Nursing Based on the Combination of Medical Care and Elderly Care on Lung Function and Quality of Life of Elderly Patients with Chronic Obstructive Pulmonary Disease. Primary Medical Forum, 27(33): 50–52.

[3] Yu Y, Liu M, Duan Y, 2022, The Effect of Continuous Nursing on Cardiopulmonary Function and Quality of Life of Elderly Patients with Chronic Obstructive Pulmonary Disease. Baotou Medical Journal, 46(2): 58–60.

[4] Li Y, 2021, The Effect of Continuous Nursing on Improving Lung Function of Elderly Patients with Chronic Obstructive Pulmonary Disease. Guide of China Medicine, 19(24): 123–124.

[5] Zhao G, Peng J, Feng G, 2021, The Influence of Continuous Nursing Combined with Traditional Chinese Medicine and Elderly Care Model on the Quality of Life and Self-efficacy of Elderly Patients with Chronic Obstructive Pulmonary Disease. Medical Diet Therapy and Health, 19(1): 11–12.

[6] Ye Y, Liang X, 2020, Analysis of the Application Effect of Continuous Nursing in Elderly Patients with Chronic Obstructive Pulmonary Disease. Chinese and Foreign Medical Research, 18(8): 108–110.

[7] Zhou H, 2019, The Effect of Continuous Nursing on Lung Function and Quality of Life of Elderly Patients with Chronic Obstructive Pulmonary Disease. Guide of China Medicine, 17(36): 255–256.

[8] Zhang J, Zhang Y, 2019, Evaluation of the Impact of Continuous Nursing Combined with Medical and Elderly Care on Elderly Patients with Chronic Obstructive Pulmonary Disease. Journal of Inner Mongolia Medical University, 41(S1): 76–78.

[9] Tang Y, Zeng F, Wang H, et al., 2019, The Effect of Continuous Nursing on the Quality of Life of Elderly Patients with Asthma-COPD Overlap Syndrome. Modern Diagnosis and Treatment, 30(7): 1192–1194.

[10] Li L, Tong H, Xie Y, et al., 2019, The Effect of Implementing Continuous Nursing on Clinical Indicators and Economic Benefits of Elderly Patients with Chronic Obstructive Pulmonary Disease. Shanxi Medical Journal, 48(4): 498–500.