

# **International Journal of General Practice Nursing**

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## International Journal of General Practice Nursing

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# Analysis of the Effectiveness and User Acceptance of Smart Wearable Devices in the Management of Chronic Diseases in the Elderly

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**Abstract:** *Objective:* To explore the application effect of smart wearable devices in the management of elderly chronic diseases and their user acceptance, with a view to providing new technical support for the health management of elderly patients with chronic diseases. *Methods:* In this study, a randomized crossover controlled trial design was adopted, and 500 elderly chronic disease patients in Xi'an City were selected as the study subjects during the period from January 2023 to January 2024, and the study subjects were randomly divided into 250 each in the control group and the observation group. The study was divided into two phases of 8 weeks each, with a 4-week washout period in the middle. In the first phase, the control group used traditional health monitoring methods and the observation group used smartwatches with physiological monitoring functions for daily health data monitoring; in the second phase, the two groups switched roles, i.e., the control group used smart wearable devices and the observation group returned to traditional monitoring methods. Through questionnaires, interviews, and physiological data collection, the application effect and user acceptance of smart wearable devices were evaluated. The study data included patients' physiological indicators such as heart rate, blood pressure, and sleep quality, as well as patients' satisfaction, frequency of use, and adherence to smart wearable devices. *Results:* In the first stage, patients in the observation group who used smartwatches had significantly higher accuracy in heart rate, blood pressure, blood glucose, and sleep quality monitoring than those in the control group ( $P < 0.05$ ). The observation group's satisfaction score (out of 5) with the smartwatch was significantly higher than the control group's ( $P < 0.05$ ). The frequency of smart wearable device use and adherence were also significantly higher in the observation group than in the control group ( $P < 0.05$ ). After the second phase of role-swapping, the original control group showed improved monitoring accuracy and adherence during the smart device use phase, whereas the original observation group showed a decrease in these indicators after returning to traditional monitoring methods, but user satisfaction and adherence remained higher than they had been in the first phase. *Conclusion:* Smart wearable devices have significant application effects in the management of chronic diseases in the elderly, can effectively improve patients' health management compliance and satisfaction, and have a high degree of user acceptance. Therefore, smart wearable devices are expected to become an important tool for the health management of elderly chronic disease patients.

**Keywords:** Smart wearable devices; Elderly; Chronic diseases; Health management; User acceptance

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# 1. Introduction

Chronic disease is a kind of disease that mostly occurs in the elderly population, including coronary heart disease, hypertension, diabetes, and so on. If timely and effective intervention cannot be given, with the continuous progress of the disease and the acute attack, it may lead to the inability of the elderly patients to seek help in time, and then irreversible and serious consequences will occur<sup>[1-3]</sup>. At present, the prevalence of chronic diseases among the elderly in China is high, and the phenomenon of coexistence of multiple diseases is common<sup>[4]</sup>. Chronic diseases have become a major problem affecting the health of the elderly population, and they have many adverse effects on the normal life of the elderly. Data from the seventh population census show that the proportion of older persons over 60 years of age in China is 18.7 percent<sup>[5]</sup>. Studies show that the elderly population suffering from chronic diseases in China is as high as 150 million, accounting for 65% of the total number of elderly people<sup>[6]</sup>. The traditional chronic disease management model is constrained by space and time, which makes it impossible to carry out chronic disease management in a timely, continuous, and effective manner, and the chronic disease control rate has been low. The traditional chronic disease management model has made it difficult to meet the needs of modern society. As an emerging health monitoring tool, smart wearable devices, with their portability and real-time monitoring function, provide new possibilities for chronic disease management in the elderly<sup>[7]</sup>. Several studies have shown that the application of smart wearable devices in the health management of patients with chronic diseases is feasible. Wearable smart devices in the field of chronic diseases are mainly applied in the field of health management, including individual health data monitoring, health risk prediction and early warning, health promotion and health education, etc.<sup>[8-9]</sup>. Based on this, this paper aims to explore the application effect and user acceptance of smart wearable devices in chronic disease management in the elderly through empirical research.

## 2. Information and methodology

### 2.1. General information

Between January 2023 and January 2024, 500 cases of elderly patients with chronic diseases in Xi'an were selected as the study subjects, and they were divided into the control group and the observation group according to the method of random number table, with 250 cases in each group. In the control group, there were 130 males and 120 females; the average age was  $(68.5 \pm 5.2)$  years old; and the types of chronic diseases were: 80 cases of hypertension, 60 cases of diabetes mellitus, 50 cases of coronary heart disease, 30 cases of chronic obstructive pulmonary disease, and 30 cases of other chronic diseases. In the observation group, there were 125 males and 125 females; the average age was  $(69.2 \pm 4.8)$  years; the types of chronic diseases: 75 cases of hypertension, 55 cases of diabetes mellitus, 45 cases of coronary heart disease, 25 cases of chronic obstructive pulmonary disease, and 50 cases of other chronic diseases. The general information of the two groups of patients was comparable with no statistically significant difference ( $P > 0.05$ ). The study was reviewed and approved by the Medical Ethics Committee of the hospital; all study subjects and their families or guardians signed an informed consent form on the premise of understanding the content of the study.

### 2.2. Inclusion and exclusion criteria

Inclusion criteria: (1) Aged 60 and above to ensure that the study population is an elderly group; (2) At least one chronic disease diagnosed and under treatment, such as hypertension, type 2 diabetes mellitus, coronary heart disease, chronic obstructive pulmonary disease, etc.; (3) Able to complete the questionnaire independently.

Exclusion criteria: (1) Severe visual or hearing impairment, which affects the completion of the questionnaire

or the use of the equipment; (2) People with a combination of mental illness or cognitive impairment; (3) Unstable health condition, recent (e.g., within the past 3 months) serious cardiac, hepatic, or renal dysfunction, or other serious illnesses that may affect the results of the study.

### 2.3. Methodology

The study was divided into two phases of 8 weeks each, with a 4-week washout period in between (the washout period was designed to remove the effects of the previous phase of the intervention and ensure the accuracy of the second phase of the assessment).

Phase 1: The control group used traditional health monitoring methods, which included the following aspects. Heart rate (HR) and blood pressure monitoring: HR and blood pressure were monitored using an Omron HEM-907XL sphygmomanometer, which was measured by the subjects themselves on a daily or weekly basis, including HR, systolic blood pressure (SBP) and diastolic blood pressure (DBP). Measurements were made in a quiet state and following the instructions for the use of the sphygmomanometer. Each measurement was taken 3 times and the average value was taken. Blood glucose monitoring. Participants were required to use the Roche Accu-Chek Performa blood glucose meter to monitor blood glucose regularly (e.g., daily or weekly) according to the doctor's instructions or personal needs, and to record fasting plasma glucose (FPG) and 2 h postprandial plasma glucose (2 h postprandial glucose (2hPG)) values. The Pittsburgh Sleep Quality Index (PSQI) was used to assess the sleep quality of the subjects, which consisted of 19 self-assessed items and 5 other-assessed items, of which the 19th self-assessed item and 5 other-assessed items were not involved in the scoring, and the 18 self-assessed items involved in the scoring consisted of 7 scoring factors, which were: sleep quality, time to sleep, sleep duration, sleep efficiency, sleep disorders, hypnotic drugs, and daytime functioning. Each factor has 0–3 points, and the sum of the 7 factor scores is the total PSQI score (0–21 points). A total score of >8 points suggests poor sleep quality, and the higher the score, the worse the sleep quality<sup>[10]</sup>. Hospital physical examination: Regular (e.g., quarterly or half-yearly) health checkups. Physical examination items include blood pressure, heart rate, blood glucose, blood lipids, electrocardiogram, and so on. Physical examination reports need to be interpreted by a professional doctor and the indicators recorded. Paper-based health logs: Paper-based health logs will be used to record the patients' own daily health status, including self-perception, medication intake, and living habits. The researcher will collect these logs regularly to assess the participants' adherence to health management. Regular follow-up: During the study period, the researcher will conduct face-to-face or telephone follow-up visits to the control group once a month to understand the use of traditional health monitoring methods, collect participants' feedback, as well as provide necessary health guidance.

The observation group will use smartwatches with physiological monitoring functions for daily health data monitoring, as described in the protocol below. The observation group will select and purchase smartwatches on their own, and the researcher will provide a recommended list of reputable and fully functional smartwatches on the market to ensure the basic monitoring functions and data accuracy of the devices. The researcher will assist the participants in understanding the features and prices of different devices so that they can choose according to their situation. (1) Smartwatch selection: the researcher will provide a recommended list of at least three smartwatches that meet the study needs, have physiological indicator monitoring functions such as blood pressure monitoring, blood glucose monitoring, heart rate monitoring, sleep quality analysis, etc., and can synchronize data to the user's mobile phone app via a wireless network. (2) Device selection guidance: The researcher will organize a device selection guidance meeting to introduce the smartwatches on the recommended list to the observation group and



provide advice and guidance on device selection. (3) Daily monitoring: The observation group will purchase the smartwatch by themselves before the study starts and follow the researcher's instructions for setting and daily use. The researcher will provide a detailed manual and online support to ensure that each participant can operate the device proficiently. (4) Data synchronization and analysis: Participants' smartwatch data will be synchronized to the cloud server via the app, and the data will be analyzed by professional software to generate health reports. The researcher will check the data synchronization regularly to ensure the accuracy and completeness of the data. (5) Regular follow-up: During the study period, the researcher will conduct face-to-face or telephone follow-up visits to the participants in the observation group once a month to learn about the use of the device, collect user feedback, and solve the problems encountered in the process of use.

Phase 2: The control and observation groups swapped monitoring methods. Between the two intervention phases, participants will enter a 4-week washout period. During this period, all participants will suspend the use of any health monitoring tools and maintain routine medical care. The research team will monitor participants' health to ensure that each study participant's health is in a stable state in preparation for the next phase of the intervention. At the end of each intervention phase and the end of the washout period, follow-up visits will be conducted either face-to-face or by phone to collect data on physiological indicators, user satisfaction, and adherence.

## 2.4. Observation indicators and evaluation criteria

Physiological monitoring indicators. The difference in accuracy between the smartwatch and traditional monitoring methods was assessed by comparing it with the results of the physical examination in the hospital. The normal value of HR was 60–100 beats/min, the normal value of FPG was 4.1–5.9 mmol/L, the normal value of 2hPG was  $\leq 7.8$  mmol/L and the normal value of hypertension was specifically referred to the “Guidelines for the Prevention and Control of High Blood Pressure in China (Revised Edition 2024)”<sup>[11]</sup>.

User satisfaction. The questionnaire was used to collect users' satisfaction with smart wearable devices, including five dimensions of device ease of use, data accuracy, timely information feedback, comfort, and battery life, with each dimension using a 5-point scale, and the higher the score, the higher the satisfaction. The Cronbach's  $\alpha$  coefficient of this questionnaire is 0.987, with good reliability and validity.

Device usage frequency. Record the frequency of use of the smartwatch, including the daily wearing time, the number of times the monitoring function is used, and so on.

Adherence. The adherence of the two groups of patients was assessed in three aspects: medication, lifestyle modification, and regular monitoring.

## 2.5. Statistical methods

SPSS 25.0 statistical software was used to process the data, and the measurement information was expressed by Mean  $\pm$  SD. The comparison between the two groups was made by independent samples *t*-test, and the counting information was expressed by n/%. The comparison between the groups was made by  $\chi^2$  test, and the difference was considered to be statistically significant at  $P < 0.05$ .

## 3. Results

### 3.1. Comparison of physiological monitoring indices in Stage I and II between the two groups of patients

In stages 1 and 2, the HR, SBP, DBP, FPG, and 2hPG of the two groups were compared, and the difference was

not statistically significant ( $P > 0.05$ ); in stages 1 and 2, the total PSQI score of the observation group was lower than that of the control group, and the difference was statistically significant ( $P < 0.05$ ); in stage 2, the total PSQI score of the two groups was lower than that of the control group, and the difference was statistically significant ( $P < 0.05$ ) (Table 1).

**Table 1.** Comparison of physiological monitoring indices between the two groups of patients in stages I and II ( $n = 250$ , Mean  $\pm$  SD)

Groups	Times	HR (cycles/min)	SBP (mmHg)	DBP (mmHg)	FPG (mmol/L)	2hPG (mmol/L)	Total PSQI score (points)
Control subjects	Stage I	77.0 $\pm$ 6.5	140.5 $\pm$ 15.0	85.0 $\pm$ 9.0	6.8 $\pm$ 1.2	10.1 $\pm$ 2.0	11.0 $\pm$ 3.5
Observation group	Stage I	76.5 $\pm$ 6.0	139.0 $\pm$ 14.5	84.5 $\pm$ 8.5	6.7 $\pm$ 1.1	9.9 $\pm$ 1.8	9.5 $\pm$ 3.0
	<i>t</i>	0.894	1.137	0.639	0.971	1.175	5.145
	<i>P</i>	0.372	0.256	0.523	0.322	0.241	0.000
Control subjects	Stage II	77.0 $\pm$ 6.0	139.0 $\pm$ 14.0	84.0 $\pm$ 8.5	6.7 $\pm$ 1.3	10.1 $\pm$ 2.1	10.0 $\pm$ 3.2*
Observation group	Stage II	76.8 $\pm$ 5.8	138.5 $\pm$ 13.8	83.8 $\pm$ 8.2	6.8 $\pm$ 1.0	9.9 $\pm$ 1.7	8.8 $\pm$ 2.8*
	<i>t</i>	0.379	0.402	0.267	0.964	1.170	4.462
	<i>P</i>	0.705	0.688	0.789	0.336	0.242	0.000

Note: \* $P < 0.05$  compared to cohort stage I

### 3.2. Comparison of User Satisfaction Scores for Stages 1 and 2 in the two groups of patients

In stages I and II, the device ease of use, data accuracy, information feedback timeliness, comfort, and battery life scores of the observation group were higher than those of the control group, and the difference was statistically significant ( $P < 0.05$ ); in stage II, the device ease of use, data accuracy, information feedback timeliness, comfort, and battery life scores of both groups were higher than those of the control group, and the difference was statistically significant ( $P < 0.05$ ) (Table 2).

**Table 2.** Comparison of user satisfaction scores at stages 1 and 2 in both groups ( $n = 250$ , Mean  $\pm$  SD)

Groups	Times	Device ease of use	Data accuracy	Timeliness of information feedback	Comfort	Battery Life
Control subjects	Stage I	3.2 $\pm$ 0.6	3.1 $\pm$ 0.5	3.0 $\pm$ 0.5	2.9 $\pm$ 0.5	2.8 $\pm$ 0.5
Observation group	Stage I	4.2 $\pm$ 0.5	4.3 $\pm$ 0.4	4.1 $\pm$ 0.4	4.1 $\pm$ 0.4	4.0 $\pm$ 0.4
	<i>t</i>	4.882	29.632	24.693	29.632	29.632
	<i>P</i>	0.000	0.000	0.000	0.000	0.000
Control subjects	Stage II	4.0 $\pm$ 0.5*	3.9 $\pm$ 0.4*	3.8 $\pm$ 0.4*	3.9 $\pm$ 0.4*	3.7 $\pm$ 0.4*
Observation group	Stage II	4.1 $\pm$ 0.5*	4.2 $\pm$ 0.4*	4.0 $\pm$ 0.4*	4.0 $\pm$ 0.4*	3.9 $\pm$ 0.4*
	<i>t</i>	2.236	8.385	5.590	2.795	5.590
	<i>P</i>	0.026	0.000	0.000	0.005	0.000

Note: \* $P < 0.05$  compared to cohort stage I

### 3.3. Comparison of the frequency of device use in Stages 1 and 2 in the two groups of patients

In stage 1, the daily wearing time of the observation group was longer than that of the control group, and the number of times the monitoring function was used was higher than that of the control group, with statistically significant differences ( $P < 0.05$ ); in stage 2, the daily wearing time of the observation group was shorter than that of the control group, and the number of times the monitoring function was used was lower than that of the control group, with statistically significant differences ( $P < 0.05$ ); in stages 1 and 2, the daily wearing time and number of times the monitoring function was used in both groups were statistically significant ( $P < 0.05$ ). Use times were compared, and the difference was statistically significant ( $P < 0.05$ ) (Table 3).

**Table 3.** Comparison of frequency of device use in Stage I and II between the two groups of patients ( $n = 250$ , Mean  $\pm$  SD)

Groups	Times	Daily wearing time (h)	Number of monitoring function uses (times)
Control subjects	Stage I	5.4 $\pm$ 1.2	4.7 $\pm$ 2.9
Observation group	Stage I	7.5 $\pm$ 1.1	9.3 $\pm$ 3.1
$t$		20.400	17.134
$P$		0.000	0.000
Control subjects	Stage 2	7.4 $\pm$ 2.1*	8.9 $\pm$ 3.7*
Observation group	Stage 2	6.5 $\pm$ 2.2*	7.3 $\pm$ 3.5*
$t$		4.679	4.967
$P$		0.000	0.000

Note: \* $P < 0.05$  compared to cohort stage I

### 3.4. Comparison of adherence between the two groups of patients in stages one and two

In stage I, the medication, lifestyle adjustment, and regular monitoring adherence of the observation group was higher than that of the control group, and the difference was statistically significant ( $P < 0.05$ ); in stage II, the comparison of medication, lifestyle adjustment, and regular monitoring adherence between the two groups was not statistically significant ( $P > 0.05$ ); in stage II, the compliance of the control group was higher than that of stage I and the difference was statistically significant ( $P < 0.05$ ) (Table 4).

**Table 4.** Comparison of adherence between the two groups of patients in stages I and II ( $n = 250$ , n/%)

Groups	Times	Medication	Lifestyle adjustments	Regular monitoring
Control subjects	Stage I	150/60.0	150/60.0	140/56.0
Observation group	Stage I	205/82.0	200/80.0	190/76.0
$\chi^2$		29.383	23.810	22.282
$P$		0.000	0.000	0.000
Control subjects	Stage II	200/80.0*	185/74.0*	175/70.0*
Observation group	Stage II	205/82.0	195/78.0	180/72.0*
$\chi^2$		0.325	1.096	0.243
$P$		0.569	0.295	0.622

Note: \* $P < 0.05$  compared to cohort stage I

## 4. Discussion

This study provides insights into the effectiveness of smart wearable devices and their user acceptance in the management of chronic diseases in the elderly through a randomized crossover controlled trial. The results of the study showed that smart wearable devices have significant advantages in terms of physiological monitoring accuracy, user satisfaction, frequency of use, and adherence.

### 4.1. Advantages of smart wearable devices in terms of physiological monitoring accuracy

Smart wearable devices monitor key physiological parameters in real time through high-precision sensors, and their monitoring results are basically the same as those of traditional monitoring methods, and they are more convenient and time-saving than traditional monitoring means. This is mainly due to the high sensitivity and real-time nature of smart devices, which can detect physiological changes in patients promptly and provide more accurate data support for chronic disease management. In addition, the portability of smart devices allows patients to conduct self-monitoring anytime and anywhere, reducing the possibility of missing monitoring due to time and location constraints, thus improving the continuity and completeness of monitoring.

### 4.2. Smart wearable devices can improve user satisfaction

User satisfaction is one of the important indicators of the application effect of smart wearable devices. The results of this study show that the observation group's satisfaction scores for smart wearable devices were significantly higher than those of the control group, and the difference was statistically significant ( $P < 0.05$ ), which may be related to a variety of factors, such as the ease of use, data accuracy, timeliness of information feedback, comfort, and battery life of smart wearable devices. Smart devices usually have intuitive user interfaces and simplified operation processes, making it easy for elderly users to get started. At the same time, smart devices can provide real-time feedback on monitoring data, allowing users to keep abreast of their health status, immediacy, and interactivity not found in traditional monitoring methods.

### 4.3. Smart wearable devices can improve the frequency of device use and adherence

The frequency of use and adherence of smart wearable devices are also important indicators for assessing the effectiveness of their application. The results of this study showed that the frequency of use and adherence during the use of smart wearable devices in the observation group were significantly higher than those in the control group, and the difference was statistically significant ( $P < 0.05$ ), which suggests that smart wearable devices can stimulate the initiative and participation of elderly patients with chronic illnesses in their health management, thus improving their adherence to medical advice and health recommendations. The reminder and motivation functions of smart devices may play an important role in this process, helping patients form good health monitoring habits through regular reminders and health goal setting.

### 4.4. Prospects of smart wearable devices in chronic disease management for the elderly

With the continuous progress of technology and the increasing improvement of functions, the application of smart wearable devices in the management of chronic diseases in the elderly has a broad prospect. Firstly, smart devices can serve as a powerful supplement to traditional medical resources, providing more convenient and personalized health management services for elderly chronic disease patients. Secondly, the data collection and analysis capabilities of smart devices offer the possibility of early intervention and precise treatment of chronic diseases. In addition, smart devices can be combined with telemedicine services to achieve remote monitoring and immediate



intervention for elderly patients with chronic diseases, improving the coverage and efficiency of medical services.

#### **4.5. Limitations of the study and future research directions**

Despite the desirable results of this study, there are some limitations. First, the study sample size was limited and restricted to elderly patients with chronic diseases in Xi'an, which may limit the general applicability of the results. Future studies may consider expanding the sample size to cover a wider range of regions and populations. Second, the follow-up time of this study was short, and the effect of long-term application of smart wearable devices and user acceptance needs to be further observed. In addition, data security and privacy protection of smart wearable devices are also important issues that need to be focused on in future studies. Future studies can further explore the effectiveness of smart wearable devices in the management of different chronic diseases and how to optimize the device functions and user interface to better meet the needs of elderly chronic disease patients.

In summary, smart wearable devices have demonstrated significant application effects and high user acceptance in geriatric chronic disease management, and are expected to become an important tool for improving the quality of health management for elderly chronic disease patients. Future research and practice should continue to explore the optimization and application of smart wearable devices to achieve the innovative development of chronic disease management in the elderly.

#### **Disclosure statement**

The authors declare no conflict of interest.

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# Study on the Impact of Respiratory Function Training and Preventive Nursing Pathway on the Prognosis of Patients with Stable COPD

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**Abstract:** *Objective:* This study aims to explore the impact of respiratory function training and preventive nursing pathways on the prognosis of patients with stable chronic obstructive pulmonary disease (COPD), providing a scientific basis for clinical nursing. *Methods:* Eighty-six patients with stable COPD from May 6, 2022, to May 6, 2023, were selected and divided into a novel group and a traditional group, with 43 patients in each group. The novel group received respiratory function training and a preventive nursing pathway, while the traditional group received routine nursing. Observation indicators included lung function indicators (forced expiratory volume in the first second (FEV1), forced vital capacity (FVC), FEV1/FVC ratio), dyspnea severity, 6-minute walking distance, quality of life (CAT questionnaire score), and the number of acute exacerbations and hospitalizations. SPSS 21.0 software was used for statistical analysis. *Results:* The novel group performed significantly better than the traditional group in FEV1, FVC, and FEV1/FVC ratio ( $P < 0.05$ ). Patients in the novel group had reduced dyspnea severity, increased 6-minute walking distance, decreased quality of life scores, and reduced acute exacerbations and hospitalizations ( $P < 0.05$ ). *Conclusion:* Respiratory function training and preventive nursing pathways can significantly improve lung function, dyspnea severity, exercise tolerance, and quality of life of patients with stable COPD, and reduce the number of acute exacerbations and hospitalizations, which has important clinical significance.

**Keywords:** Chronic obstructive pulmonary disease (COPD); Respiratory function training; Preventive nursing pathway; Lung function; Quality of life

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## 1. Introduction

Chronic obstructive pulmonary disease (COPD) can severely affect patients' quality of life and prognosis. Currently, drug therapy, oxygen therapy, rehabilitation therapy, and so on are the main treatment methods for

COPD. However, these treatments can only provide symptomatic relief and cannot effectively halt the progression of the disease. Nursing care is crucial for patients with stable COPD to delay disease progression, reduce acute exacerbations, and improve quality of life. Studies have shown that respiratory function training can enhance respiratory muscle strength, improve lung function, and increase patients' exercise tolerance and quality of life <sup>[1]</sup>. Through measures such as establishing patient profiles, health education, environmental management, and exercise guidance, preventive nursing can improve patients' self-management abilities, reduce risk factors for the disease, and lower the risk of acute exacerbations. However, research on the impact of respiratory function training and preventive nursing pathways on the prognosis of patients with stable COPD still has some gaps. This study aims to delve into the effects of respiratory function training and preventive nursing pathways on the prognosis of patients with stable COPD, providing a scientific basis for clinical nursing.

## **2. Materials and methods**

### **2.1. Baseline information**

Eighty-six patients with stable chronic obstructive pulmonary disease (COPD) from May 6, 2022, to May 6, 2023, were selected as study subjects and divided into a new-style group and a traditional group, with 43 patients in each group.

In the new-style group, there were 25 males and 18 females, with an age range of 52.25 to 78.47 years and a mean age of  $64.23 \pm 1.29$  years. The disease duration ranged from 5.26 to 15.58 years, with a mean duration of  $8.65 \pm 1.28$  years.

In the traditional group, there were 23 males and 20 females, with an age range of 50.26 to 76.25 years and a mean age of  $63.82 \pm 1.58$  years. The disease duration ranged from 4.96 to 16.58 years, with a mean duration of  $8.52 \pm 1.39$  years.

Inclusion criteria: Meet the diagnostic criteria for stable COPD; aged 50 years or older; able to cooperate and complete respiratory function training and nursing intervention; signed informed consent.

Exclusion criteria: Combined severe cardiac, liver, kidney, and other important organ dysfunction; suffering from mental illness or cognitive impairment; COPD patients in acute exacerbation stage; patients unable to cooperate and complete the study.

Upon comparison, there were no significant differences in baseline data between the two groups ( $P > 0.05$ ).

### **2.2. Methods**

Patients in the traditional group received routine nursing care, including detailed condition observation, medication guidance, and dietary nursing.

Patients in the new-style group received respiratory function training and preventive nursing pathways.

#### **2.2.1. Respiratory function training**

Pursed-lip breathing: Patients close their mouths, inhale through their noses, and then exhale slowly through pursed lips. The inhalation to exhalation time ratio is 1:2 or 1:3. Each training session lasts for 10–15 minutes, 3–4 times per day. Abdominal breathing: Patients take a comfortable position, relax their whole body, and place their hands on their abdomen and chest. During inhalation through the nose, the abdomen rises, and during exhalation, the abdomen falls. They try to make the exhalation time longer than the inhalation time. Each training session lasts for 10–15 minutes, 3–4 times per day.

### 2.2.2. Preventive nursing pathway

Establish individual patient files to record detailed patient conditions, treatment status, and nursing needs. Regularly conduct health education to explain the causes, symptoms, treatment methods, and preventive measures of COPD to patients and their families, improving patients' self-management abilities. Strengthen environmental management to maintain fresh air and suitable temperature in the ward, avoiding patients' exposure to harmful gases and dust. Guide patients to perform moderate exercise such as walking and Tai Chi to enhance their physical fitness. Closely monitor changes in patients' conditions and promptly detect and manage complications.

### 2.3. Observation indicators

Analyze and compare the lung function indicators of the two groups of patients before and after intervention. Details include: forced expiratory volume in the first second (FEV<sub>1</sub>), forced vital capacity (FVC), and FEV<sub>1</sub>/FVC ratio.

Analyze and compare the degree of dyspnea and 6-minute walking distance before and after intervention in both groups. The modified British Medical Research Council (mMRC) dyspnea scale is used for evaluation, which is divided into 0–4 levels. The higher the level, the more severe the dyspnea. Patients are asked to walk as fast as possible on a flat surface for 6 minutes, and the walking distance is measured.

Analyze and compare the quality of life before and after intervention in both groups. The Chronic Obstructive Pulmonary Disease Assessment Test (CAT) questionnaire is used for evaluation, including details such as coughing, expectoration, chest tightness, and mobility. The total score ranges from 0–40, with a higher score indicating a poorer quality of life.

Analyze and compare the number of acute exacerbations and hospitalizations in both groups.

### 2.4. Statistical principles

This experiment uses the SPSS 21.0 software package. *t*-values are used to calculate measurement data, and chi-square values are used to calculate count data. Statistical differences are considered significant when  $P < 0.05$ .

## 3. Results

### 3.1. Detailed comparison of lung function indicators before and after intervention in both groups

The comparison of lung function indicators before and after intervention in both groups is shown in **Table 1**.

**Table 1.** Detailed comparison of lung function indicators before and after intervention in both groups (Mean  $\pm$  SD)

Group	Time period	FEV <sub>1</sub> (L)	FVC(L)	FEV <sub>1</sub> /FVC(%)
New group ( $n = 43$ )	Before intervention	1.25 $\pm$ 0.21	2.56 $\pm$ 0.32	48.85 $\pm$ 5.23
	After intervention	1.68 $\pm$ 0.25	2.98 $\pm$ 0.35	55.21 $\pm$ 5.45
	<i>t</i>	4.228	6.396	9.638
	<i>P</i>	<0.05	<0.05	<0.05
Traditional group ( $n = 43$ )	Before intervention	1.23 $\pm$ 0.20	2.54 $\pm$ 0.31	48.52 $\pm$ 5.18
	After intervention	1.42 $\pm$ 0.23	2.75 $\pm$ 0.33	51.36 $\pm$ 5.32
	<i>t</i>	3.936	5.025	7.118
	<i>P</i>	<0.05	<0.05	<0.05

### 3.2. Comparison of the degree of dyspnea and 6-minute walking distance before and after intervention in two groups of patients

The comparison of the degree of dyspnea and 6-minute walking distance before and after intervention in two groups of patients is shown in **Table 2**.

**Table 2.** Comparison of the degree of dyspnea and 6-minute walking distance before and after intervention in two groups of patients (Mean  $\pm$  SD)

Group	Degree of dyspnea (mMRC grade)	Degree of dyspnea (mMRC grade)
New group ( $n = 43$ )	$2.56 \pm 0.35$	$350.25 \pm 25.68$
	$1.23 \pm 0.22$	$450.56 \pm 30.25$
$t$	5.693	23.695
$P$	<0.05	<0.05
Conventional group ( $n = 43$ )	$2.58 \pm 0.34$	$348.52 \pm 24.85$
	$1.85 \pm 0.28$	$400.23 \pm 28.56$
$t$	4.025	15.227
$P$	<0.05	<0.05

### 3.3. Comparison of quality of life before and after intervention in two groups of patients

The comparison of quality of life before and after intervention in two groups of patients is shown in **Table 3**.

**Table 3.** Comparison of quality of life before and after intervention in two groups of patients (Mean  $\pm$  SD)

Group	Symptoms	Activity ability	Psychological state	Total score
New group ( $n = 43$ )	$15.25 \pm 2.32$	$12.56 \pm 1.85$	$8.52 \pm 1.23$	$36.33 \pm 4.21$
	$8.23 \pm 1.56$	$7.52 \pm 1.25$	$4.21 \pm 0.85$	$20.06 \pm 2.52$
$t$	7.859	6.339	5.294	18.557
$P$	<0.05	<0.05	<0.05	<0.05
Conventional group ( $n = 43$ )	$15.31 \pm 2.28$	$12.48 \pm 1.82$	$8.48 \pm 1.21$	$36.27 \pm 4.18$
	$10.56 \pm 1.85$	$9.23 \pm 1.52$	$5.85 \pm 1.02$	$25.64 \pm 3.21$
$t$	5.142	4.228	4.154	14.226
$P$	<0.05	<0.05	<0.05	<0.05

### 3.4. Comparison of acute exacerbation frequency and hospitalization frequency between the two groups of patients

The comparison of acute exacerbation frequency and hospitalization frequency between the two groups of patients is shown in **Table 4**.



**Table 4.** Comparison of acute exacerbation frequency and hospitalization frequency between the two groups of patients (Mean  $\pm$  SD)

Group	Acute exacerbation frequency	Hospitalization frequency
New group ( $n = 43$ )	1.25 $\pm$ 0.32	0.52 $\pm$ 0.21
Traditional group ( $n = 43$ )	2.15 $\pm$ 0.45	1.23 $\pm$ 0.35
<i>t</i>	4.582	5.036
<i>P</i>	<0.05	<0.05

## 4. Discussion

In this study, patients in the new-style group underwent an intervention combining respiratory function training and a preventive nursing pathway. The results showed that their FEV1, FVC, and FEV1/FVC ratios were significantly better than those in the traditional group, which has important clinical implications. The pursed-lip breathing and abdominal breathing in respiratory function training specifically exercise the respiratory muscles through specific breathing patterns. Pursed-lip breathing allows the exhaled air to flow out slowly, increasing airway pressure and preventing small airways from collapsing too early, thereby improving ventilatory function. Abdominal breathing, on the other hand, fully engages respiratory muscles such as the diaphragm, increases the range of motion of the thoracic cage, and enhances lung ventilation and gas exchange efficiency. The synergistic effect of these two breathing training methods effectively strengthens the respiratory muscles, laying a foundation for improving lung function.

The establishment of patient files in the preventive nursing pathway provides a basis for personalized care. By carefully documenting patients' conditions, treatment status, and nursing needs, healthcare professionals can more precisely develop nursing plans that meet the specific needs of patients<sup>[2]</sup>. Health education empowers patients with a correct understanding of the disease, allowing them to understand the pathogenesis, treatment methods, and self-management essentials of COPD, thus actively participating in disease management. Environmental management measures reduce the stimulation of harmful factors on the lungs, such as maintaining air freshness and avoiding exposure to harmful gases and dust, creating a relatively good external environment for the lungs. These measures collectively improve patients' self-management abilities, enabling them to better cooperate with treatment and nursing, thereby promoting the improvement of lung function.

In clinical practice, traditional nursing methods for stable COPD patients often focus on symptom relief and basic medical care, with limited long-term improvement in lung function. The new nursing method, however, offers a more comprehensive and systematic approach for healthcare professionals. Through respiratory function training, patients can perform standardized self-exercise under the guidance of healthcare professionals, improving the endurance and strength of respiratory muscles. This not only helps improve current lung function but also enhances patients' physical fitness and resistance to disease, reducing the risk of acute exacerbations. The preventive nursing pathway provides patients with comprehensive nursing services from multiple aspects, from establishing files to health education and environmental management. Each link is closely related to patients' needs and disease characteristics. The integrated nursing method can improve patients' satisfaction with nursing and enhance their treatment compliance. Simultaneously, due to its significant improvement in lung function indicators, it also helps reduce medical costs and resource consumption. In long-term clinical applications, the new nursing method is expected to become the standard mode of care for stable COPD patients, making a greater

contribution to improving their quality of life and prognosis <sup>[3]</sup>.

In this study, the novel nursing approach significantly improved stable COPD patients in terms of dyspnea severity and 6-minute walking distance. After receiving respiratory function training and preventive nursing pathways, patients in the novel group experienced a notable reduction in dyspnea severity and a remarkable increase in the 6-minute walking distance. This fully demonstrates the effectiveness of this nursing approach in improving patients' exercise tolerance and alleviating dyspnea symptoms. By strengthening the strength and endurance of respiratory muscles, respiratory function training provides strong support for patients' respiratory regulation during exercise. Through pursed-lip breathing and abdominal breathing training, patients can more effectively control their breathing rhythm and depth, reducing respiratory work and thereby alleviating the sensation of dyspnea. Strong respiratory muscles ensure an adequate oxygen supply during exercise, reducing movement restrictions caused by shortness of breath. Based on the specific conditions of the patients, professional exercise guidance will develop personalized exercise programs, gradually increasing exercise intensity and duration to help patients improve exercise tolerance. Meanwhile, psychological support is also indispensable. Due to dyspnea, stable COPD patients often experience negative emotions such as anxiety and fear, which can further exacerbate dyspnea symptoms. Through psychological counseling, relaxation training, and other methods, psychological support can help patients alleviate negative emotions, enhance their confidence in overcoming the disease, and thus make them more actively participate in exercise, thereby improving their athletic ability <sup>[4]</sup>.

Upon further analysis, the novel nursing approach has achieved remarkable results in improving the quality of life for patients with stable COPD. The scores of patients in the novel group were significantly lower than those in the traditional group in terms of symptoms, activity level, and psychological state, indicating a significant improvement in their quality of life. This improvement is mainly attributed to the synergistic effect of respiratory function training and preventive nursing pathways. Pursed-lip breathing and abdominal breathing can enhance the strength and endurance of respiratory muscles, making it easier for patients to breathe in their daily lives and greatly improving their physical comfort. The improvement in patient's physical comfort not only reduces their physical pain but also provides the basic conditions for them to participate in various activities. After systematic and comprehensive health education, patients can have a deeper understanding of COPD, including its development process, treatment methods, and self-management essentials. This enables patients to more actively cooperate with treatment and nursing, and adopt correct lifestyles and self-management measures to better cope with the disease. Psychological support plays a crucial role in enhancing patients' self-confidence and resilience. Professional psychological counseling and support help patients overcome negative emotions such as anxiety and fear caused by the disease, build confidence in overcoming the disease, and face life with a more optimistic attitude. A scientific and reasonable exercise program is tailored to the patient's physical condition, gradually improving their physical fitness and athletic ability. Nutrition management provides adequate nutritional support for patients through reasonable dietary combinations, enhancing their immunity and improving their body's resistance. These measures work together to improve patients' quality of life from multiple perspectives <sup>[5]</sup>.

Patients with COPD in acute exacerbation often face severe symptoms such as dyspnea, coughing, and expectoration, causing great discomfort to the body. At the same time, reducing the frequency of acute exacerbations can also alleviate the economic burden. Frequent acute exacerbations can lead to multiple hospitalizations for patients, increasing medical expenses and causing significant financial pressure on families. Reducing the number of acute exacerbations and hospitalizations can improve patient's quality of life, allowing them to better participate in daily activities and enjoy life. Typically, patients with acute exacerbations of COPD



require a significant amount of medical resources, including hospital beds, time and effort from medical staff, and so on. Reducing the occurrence of acute exacerbations through preventive nursing pathways and respiratory function training allows for a more reasonable allocation of limited medical resources, thereby improving the efficiency of the healthcare system. Strengthening disease monitoring can detect changes in patients' conditions in a timely manner, allowing for early intervention measures to prevent acute exacerbations. Prompt treatment of complications can prevent their further deterioration, thereby reducing the risk of acute exacerbations. Respiratory function training can improve patients' lung function and immunity, making their bodies healthier, reducing the risk of infection, and ultimately decreasing the occurrence of acute exacerbations.

Preventing acute exacerbations of COPD can be approached from multiple angles. Patients should quit smoking and avoid secondhand smoke, maintain clean air, avoid respiratory infections, and receive flu and pneumonia vaccines. Respiratory function training, such as pursed-lip breathing and diaphragmatic breathing, should be performed. A balanced diet and appropriate body weight should be maintained to provide nutritional support. Patients should strictly follow doctors' advice on medication, have regular check-ups, and self-monitor their condition. Additionally, maintaining a positive attitude and receiving support from family members is important.

## Disclosure statement

The authors declare no conflict of interest.

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# Research on Nursing Methods and Psychological Intervention for Scar Repair

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**Abstract:** Scar repair involves not only the application of medical techniques but also the consideration of the patient's psychological state. Through appropriate nursing measures, wound healing can be effectively promoted, complications can be reduced, and hypertrophic scarring can be prevented. Psychological intervention, by alleviating negative emotions such as anxiety and depression, improves patient compliance with treatment and enhances self-management abilities, thereby promoting recovery. Research indicates that the combination of nursing interventions and psychological counseling helps improve the overall recovery experience for patients, facilitating scar repair physiologically while also providing psychological support, thus enhancing the patient's quality of life. The multidisciplinary collaboration model offers a comprehensive treatment plan, further optimizing the scar repair process.

**Keywords:** Scar repair; Nursing methods; Psychological intervention; Patient recovery; Psychological counseling

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## 1. Introduction

Scars are a common natural healing phenomenon following skin trauma or surgery, and their appearance and functional impairment can significantly impact the physical and mental health of patients. Severe scars, in particular, may lead to changes in body shape and psychological distress. Therefore, nursing care and psychological intervention during the scar repair process are of utmost importance. Nursing methods play a key role in the treatment of scars, including wound management, scar prevention, and the prevention of complications. The patient's psychological state, especially their perception of the scar and emotional reactions, can also affect recovery outcomes. This paper will focus on exploring the nursing techniques and psychological interventions in scar repair, and how they work together to promote the overall recovery of patients.

## **2. Nursing methods in scar repair**

### **2.1. Wound care and nursing**

Wound care is the foundation of scar repair. Proper cleaning, disinfection, and dressing can effectively prevent infection, thereby reducing the risk of scar hypertrophy. The wound should be cleaned as soon as possible using a non-irritating antiseptic solution (such as saline or iodine tincture) to gently cleanse the wound surface, removing dirt and bacteria. Harsh disinfectants should be avoided to prevent skin irritation. After disinfection, the wound should be kept dry and covered with a sterile dressing to isolate it from external bacteria. Regular dressing changes not only help keep the wound clean but also allow for timely observation of wound healing. If infection or abnormalities are detected, appropriate measures should be taken immediately. The wound's ventilation is also crucial—excessive occlusion can cause moisture buildup, delaying the healing process. Adequate airflow helps dry the wound, promotes scab formation, and the development of new skin, thereby reducing scar formation.

### **2.2. Topical medications and therapies**

Topical medications play a key role in scar repair, with common drugs including silicone gel, anti-itch ointments, and antibiotics. Silicone gel, as an external medication, forms a thin film that effectively locks in moisture, softens scar tissue, and promotes fibrosis, thereby reducing scar hypertrophy. Ointments such as corticosteroid creams can effectively reduce inflammation at the scar site and prevent excessive tissue growth. Physical therapies, such as laser treatment and ultrasound therapy, are widely used in scar repair. Laser treatment applies precise light beams to scar tissue, improving the scar's appearance and reducing pigmentation. Ultrasound therapy, through vibrations, promotes the absorption of scar tissue and enhances blood circulation, improving the quality of scar healing.

### **2.3. Postoperative care and prevention of complications**

Postoperative care directly affects the scar repair outcome, especially in the early stages, where nursing interventions are crucial. First, avoiding friction and stretching of the scar can effectively reduce the risk of hypertrophic scarring. Postoperatively, patients should limit physical activity, particularly excessive stretching of the wound site, and avoid strenuous labor too soon. Secondly, infection prevention is an important task in postoperative care. Antibiotic therapy should be used to prevent infection while keeping the wound clean and dry. Lastly, for patients at high risk of developing hypertrophic scars (such as those with genetic predisposition), early preventive treatments, such as silicone dressings or pressure therapy, can be applied to reduce the likelihood of excessive scarring.

## **3. The role of psychological intervention in scar repair**

### **3.1. Psychological assessment and intervention strategies**

In the process of scar repair, the patient's psychological state is often overlooked, yet emotional issues such as anxiety, depression, and low self-esteem can affect recovery outcomes. Therefore, conducting a systematic psychological assessment is essential. The assessment includes a comprehensive evaluation of the patient's emotional state, cognitive biases, and social adaptation abilities, identifying potential psychological issues. Based on this evaluation, cognitive-behavioral therapy (CBT) can be used to help patients identify negative emotions and thought patterns and to improve their psychological state by adjusting cognitive structures. Supportive therapy provides emotional support, empathy, and encouragement, helping patients actively engage in the treatment process, boosting their confidence, alleviating anxiety and depression, and promoting recovery.

### **3.2. Emotional regulation and counseling methods**

Emotional regulation is crucial for psychological intervention during scar repair. Talk therapy is an effective approach, as it establishes a trusting relationship with the patient, allowing them to express internal struggles, reduce psychological pressure, and release negative emotions. Additionally, group psychological support is a beneficial intervention method. By communicating with other patients and sharing treatment experiences, patients can feel social support, alleviating feelings of loneliness and helplessness. Emotional regulation training and relaxation techniques (such as deep breathing and meditation) can also help patients reduce anxiety, restore psychological balance, and promote self-healing.

### **3.3. Patient education and enhancement of self-management skills**

Patient education is an important means of improving treatment compliance. Educating patients about the scar repair process and key considerations helps them set realistic expectations, reducing excessive or insufficient expectations of treatment outcomes, and thereby alleviating anxiety. Furthermore, educating patients on self-management, including wound care, medication usage, and psychological regulation, can enhance their sense of participation and control over the treatment process, improving compliance. Strengthening self-management skills not only helps patients better cooperate with treatment but also provides psychological support, promoting the simultaneous recovery of both physical and mental health.

## **4. Integrated application of nursing methods and psychological intervention**

### **4.1. Advantages of integrated nursing and psychological intervention**

The combination of nursing methods and psychological intervention can significantly enhance the overall effect of scar repair. Single nursing measures or psychological interventions may be limited to local treatment, whereas integrated nursing and psychological intervention can systematically promote both physiological and psychological recovery for the patient. Nursing methods primarily focus on wound management, medication treatment, and prevention of complications, while psychological intervention helps patients alleviate negative emotions such as anxiety and depression through emotional regulation, cognitive adjustment, and social support. The combination of both can enhance patient compliance, promote wound healing, alleviate the psychological distress caused by scars, improve the patient's quality of life, and accelerate overall recovery.

### **4.2. Development of personalized nursing and intervention plans**

Developing personalized nursing and psychological intervention plans is crucial for different types of scar patients. Factors such as the patient's physical condition, the nature of the trauma, psychological state, and cultural background all influence the treatment outcomes. Therefore, nursing staff and psychological intervention experts need to conduct a precise assessment based on the patient's specific situation and design a treatment plan that suits their needs. For example, for patients with severe psychological distress, in addition to regular nursing care, enhanced psychological counseling should be provided, using cognitive-behavioral therapy to alleviate anxiety or depressive emotions. For patients with higher self-management capabilities, the focus can be on education and guidance to improve their autonomous nursing abilities, reduce dependence on medical interventions, and promote recovery.

### **4.3. The necessity of multidisciplinary team collaboration**

The nursing and psychological intervention for scar repair requires the collaborative efforts of a multidisciplinary

team. Surgeons, nurses, psychotherapists, and other relevant professionals should work together to develop a comprehensive treatment plan based on the patient's specific needs. Surgeons are responsible for the medical treatment of scars and surgical procedures, nurses provide professional nursing services, including wound care and postoperative follow-up, while psychotherapists assess and intervene in the patient's psychological state and offer emotional support. Through close teamwork, both physiological and psychological support can be provided comprehensively, ensuring the maximization of treatment effectiveness, as well as improving patient satisfaction and treatment compliance.

## 5. Conclusion

Scar repair is a complex process that requires not only scientific nursing methods but also attention to the patient's psychological state. The combination of nursing methods and psychological intervention can significantly improve the outcomes of scar repair and promote the patient's overall recovery. Through the development of personalized nursing plans and multidisciplinary team collaboration, comprehensive support can be provided to patients, enhancing treatment compliance and reducing psychological distress. Future research and practice should place greater emphasis on bidirectional interventions for both physical and psychological aspects, further optimizing treatment plans and promoting the overall physical and mental health of patients.

## Disclosure statement

The authors declare no conflict of interest.

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# Observation on the Effect of Implementing Comprehensive Nursing Interventions for Cardiothoracic Surgery Patients

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**Abstract:** Objective: To observe the rehabilitation effect of cardiothoracic surgery patients after the implementation of comprehensive nursing intervention. Methods: Eighty patients who underwent cardiothoracic surgery in a hospital from April 2023 to March 2024 were selected and divided into the control group (n=40) and the observation group (n=40) according to the method of randomized numerical table, with the control group adopting conventional nursing interventions and the observation group implementing comprehensive nursing interventions. Comparison of respiratory function, complication rate and quality of life (QOL) score indexes in the two groups. Results: Comparing the respiratory function of the two groups, the ratio of the 1st second exertion respiratory volume to the exertion lung capacity of the patients in the observation group ( $0.57 \pm 0.01$ ), Exertion respiratory volume at 1st second ( $1.45 \pm 0.04$ )L, ( $2.54 \pm 0.31$ )L, and partial pressure of oxygen ( $94.03 \pm 5.17$ )mmHg were higher than those of the control group ( $0.41 \pm 0.02$ ), ( $90.12 \pm 5.28$ )L, ( $2.29 \pm 0.28$ )L, and ( $94.03 \pm 5.17$ )mmHg, and partial pressure of carbon dioxide of the observation group patients ( $36.55 \pm 3.15$ )mmHg was lower than that of the control group ( $41.47 \pm 3.23$ ) mmHg. The difference was statistically significant ( $P < 0.05$ ); 1 case of lower limb deep vein thrombosis occurred in the observation group, lung infection in the observation group, with a total incidence rate of 5.00%, and 1 case of incision infection in the control group, 2 cases of postoperative bleeding in the control group, Arrhythmia 3 cases, lower limb deep vein thrombosis In the control group, there were 2 cases of postoperative bleeding, 3 cases of cardiac arrhythmia, 3 cases of lower limb deep vein thrombosis, and 1 case of pulmonary infection, with a total incidence rate of 22.50%, and the difference between the groups was statistically significant ( $P < 0.05$ ); the scores of social function, physical function, emotional function, physical function, mental health, general health, vitality, and physical pain in each dimension of the patients in the observation group were significantly higher than those in the control group, and the difference was statistically significant ( $P < 0.05$ ). Conclusion: The implementation of comprehensive nursing interventions for cardiothoracic surgery patients can effectively improve patients' pulmonary function indexes, reduce the risk of related complications, and improve patients' quality of life, which is worth promoting.

**Keywords:** Cardiothoracic surgery; Surgery; Integrated care; Respiratory function; Quality of life (QOL); Complications

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## 1. Introduction

Cardiothoracic surgical diseases mainly include cardiac surgery and general thoracic surgery related diseases, and the main treatment means is surgical program <sup>[1-2]</sup>. Cardiothoracic surgery is mainly characterised by long time, high risk and high difficulty of operation, which also causes certain trauma to patients, coupled with the fact that intraoperative operations will inevitably have a certain impact on the respiratory function of the patient, the patient is very susceptible to postoperative infections, cardiac arrhythmia, lower limb deep vein thrombosis and other adverse events, which seriously affects the postoperative recovery process <sup>[3]</sup>. Due to the lack of comprehensive targeted care for patients in traditional nursing interventions, the effect of nursing interventions is very limited <sup>[4]</sup>. Comprehensive nursing intervention is a patient-centred, comprehensive and targeted nursing intervention program, which accelerates the recovery process and ensures the life and health of patients through nursing interventions in physical, psychological and social aspects. In view of this, this study adopts a randomized controlled method to study 80 cases of cardiothoracic surgery patients admitted to investigate the rehabilitation effect after integrated nursing intervention, and the results are reported as follows:

## 2. Information and methodology

### 2.1. General information

Eighty patients who underwent surgical treatment in the cardiothoracic surgery department of a hospital from April 2023 to March 2024 were selected and divided into a control group (40 cases) and an observation group (40 cases) using the mean score method. In the control group, there were 21 males and 19 females; ages ranged from 22 to 69, with a mean age of  $(42.25 \pm 3.85)$  years. In the observation group, there were 22 males and 18 females; the age ranged from 24 to 70, with a mean age of  $(44.85 \pm 3.65)$  years. Comparing the general information of the patients in the two groups, the difference was not statistically significant ( $P > 0.05$ ).

Inclusion criteria: (1) those who had not received any cardiothoracic surgical treatment; (2) aged between 22~70 years; (3) good patient compliance and cooperation; (4) patients voluntarily and signed an informed consent form.

Exclusion criteria: (1) no cardiothoracic surgical indication; (2) the presence of mental illness, communication disorders, developmental insufficiency; (3) pregnant or breastfeeding patients; (4) history of infectious diseases and hypertension, diabetes mellitus and other chronic diseases.

### 2.2. Methodology

The control group adopted conventional nursing methods, and the nursing content included preoperative visits, health education, diet education, psychological counselling, medication guidance and condition monitoring. The observation group implemented comprehensive nursing interventions.

#### 2.2.1. Professional nursing

When the patients were admitted to the hospital, they were assessed for their physical condition, instructed to complete the preoperative examination, and were introduced to the patients in detail about the surgical process, purpose, precautions and other related knowledge, so that they were ready for the surgery. Answer the questions raised by the patients, listen patiently to the patients' demands, and give effective psychological counselling to the patients when they are in low mood, eliminate their negative emotions, relieve their preoperative tension, and ensure that they maintain a good psychological state to actively cooperate with the treatment.

### **2.2.2. Intraoperative care**

Work closely with the doctor, closely monitor and observe the patient's respiration, pulse, blood pressure and other vital signs, and inform the doctor as soon as possible of any abnormality, so that he or she can take emergency intervention.

### **2.2.3. Postoperative care**

Tell the patients to take antibiotics for anti-infection treatment as prescribed by the doctor, and report to the doctor for treatment if any abnormality occurs. Pressure bandage should be applied to the incision with moderate tightness, and the incision dressing should be changed regularly to keep the incision clean and dry and prevent infection; before the wound is completely healed, patients should be avoided from contacting water. If the incision appears red, swollen and ulcerated, there is exudate ooze or the patient complains of discomfort, promptly reflect to the doctor for treatment.

### **2.2.4. Dietary care**

Advise patients to consume high protein, high fibre, low salt and low fat food, explain the significance and importance of scientific diet to patients, let them maintain good dietary habits, and tell patients to prohibit smoking, alcohol, spicy and stimulating food.

### **2.2.5. Rehabilitation training**

Instruct patients to learn to master abdominal breathing, relax the shoulders and back, contract the abdomen, breathe deeply, and instruct patients to control the breathing rhythm from deep to slow. At the same time, instruct the patient to carry out moderate rehabilitation exercises to improve the function of the respiratory system in order to promote the recovery of the body function.

### **2.2.6. Heart rate nursing**

Listen to the patient's feelings and concerns in a gentle and patient manner, and give the patient a chance to express his or her anxiety, fear and other emotions, so that the patient can feel cared about and thus establish a trusting relationship. At the same time, introduce successful cases of surgery to patients, so that they can understand that their condition is developing in a good direction and enhance their confidence in recovery. Encourage the patient's family members to stay by their side more often so that the patient can gain a sense of psychological security.

## **2.3. Observation indicators**

Indicators of improvement in respiratory function: comparison of the ratio of exertional respiratory volume to exertional lung volume in the first second, exertional respiratory volume in the first second, exertional lung volume ratio, blood oxygen partial pressure, and carbon dioxide partial pressure.

Complication rate: observation records. Incision infection, Postoperative haemorrhage, Arrhythmia

Postoperative haemorrhage, cardiac arrhythmia, lower extremity deep vein thrombosis, Lung infection and other complications, incidence rate = number of cases/total number of cases x 100%.

Quality of (QOL) score: The patients' quality of life was assessed using the Health Status Questionnaire (36-ItemShort-Form, SF-36), which contains social function, Physiological functioning, Emotional functioning, physiological functioning, Mental health, vitality, general health, somatic pain, and other 8 dimensions, each dimension score is quantified as a 100-point scale, with a higher score indicating a more significant improvement



in the patient's quality of life.

## 2.4. Statistical methods

SPSS26.0 software was used to statistically process and analyse the data obtained from this study, the counting data were expressed in terms of cases (%) and  $\chi^2$  test; the measuring data were expressed in terms of (Mean  $\pm$  SD),  $t$  test was used when they met the normal distribution, and non-parametric test was used when they didn't meet the normal distribution; the single-item ordinal data were used in terms of rank-sum test, and the  $P < 0.05$  indicated that the difference was statistically significant.

## 3. Results

### 3.1. Comparison of the improvement of respiratory function indexes between the two groups

Comparing the pulmonary function indexes of the two groups, the ratio of 1st second exertion respiratory volume to exertion lung capacity of the patients in the observation group, 1st second exertion respiratory volume, The forced vital capacity ratio indicated heart disease ( $P < 0.05$ ); compared with the blood gas analysis indicators, the blood oxygen partial pressure and heart disease and hypertension partial pressure of the observation group were lower than those of heart disease, and the difference indicated statistical significance ( $P < 0.05$ ) (Table 1).

**Table 1.** Comparison of the improvement of respiratory function indexes between the two groups (Mean  $\pm$  SD).

Groups	Ratio of expiratory volume to expiratory lung capacity at 1st second (%)	Exertion breath volume at 1st second (L)	Exertion lung volume ratio (L)	Partial pressure of blood oxygen (mmHg)	Carbon dioxide partial pressure (mmHg)
Control group ( $n=40$ )	0.41 $\pm$ 0.02	1.18 $\pm$ 0.05	2.29 $\pm$ 0.28	90.12 $\pm$ 5.28	41.47 $\pm$ 3.23
Observation group ( $n=40$ )	0.57 $\pm$ 0.01	1.45 $\pm$ 0.04	2.54 $\pm$ 0.31	94.03 $\pm$ 5.17	36.55 $\pm$ 3.15
$t$	45.2548	26.6687	3.7851	3.3464	6.8969
$P$	0.0000	0.0000	0.0003	0.0013	0.0000

### 3.2. Comparison of complication rates between the two groups

Postoperative incision infection in the observation group, haemorrhage, arrhythmia, Lower limb deep vein thrombosis, Pulmonary infection complication rate was significantly lower than that of the control group, and the difference was statistically significant ( $P < 0.05$ ) (Table 2).

**Table 2.** Comparison of the incidence of postoperative complications between the two groups of patients [n (%)]

Groups	Cutaneous infection	Post-operative bleeding	Arrhythmia	Deep vein thrombosis of the lower limbs	Lung infection	Rate of occurrence
Control group ( $n=40$ )	1 (2.50)	2 (5.00)	3 (7.50)	2 (5.00)	1 (2.50)	9 (22.50)
Observation group ( $n=40$ )	0	0	0	1 (2.50)	1 (2.50)	2 (5.00)
$\chi^2$						5.1647
$P$						0.0231

### 3.3. Comparison of QOL scores between the two groups

Comparing the QOL scores of the two groups, the scores of social functioning, physical functioning, emotional functioning, physical functioning, mental health, general health, vitality and somatic pain dimensions of the patients in the observation group were significantly higher than those of the control group, and the differences were all statistically significant ( $P < 0.05$ ) (Table 3).

**Table 3.** Comparison of QOL scores (Mean  $\pm$  SD, points)

Groups	Social function	Physiological function	Emotional function	Physiological function	Mental health	Vigour	General health	Pain in the body
Control group (n=40)	81.59 $\pm$ 2.09	81.16 $\pm$ 2.13	82.44 $\pm$ 2.03	81.62 $\pm$ 1.73	82.85 $\pm$ 2.14	83.45 $\pm$ 2.07	83.41 $\pm$ 2.16	83.17 $\pm$ 2.22
Observation group (n=40)	85.52 $\pm$ 2.04	87.33 $\pm$ 2.12	86.01 $\pm$ 1.83	86.69 $\pm$ 1.87	87.72 $\pm$ 2.08	86.02 $\pm$ 2.10	86.48 $\pm$ 2.19	85.89 $\pm$ 2.27
<i>t</i>	8.5105	12.9849	8.2612	12.5870	10.3209	5.5123	6.3122	5.4180
<i>P</i>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

## 4. Discussion

Cardiothoracic surgery is an important means of treating a wide range of thoracic and cardiac diseases, but with high surgical complexity and trauma, patients are prone to preoperative anxiety and fear, and may face both physiological and psychological challenges postoperatively due to pain and concerns about prognosis [5]. Although the risks of cardiothoracic surgery based on minimally invasive concepts have been significantly reduced in recent years, benefiting from the continuous improvement of modern medical standards, the postoperative recovery process is still affected by various reasons, such as patients' lack of understanding of their own conditions, resistance to surgical diagnostic and treatment options, and failure to actively cooperate with healthcare interventions, resulting in a delayed postoperative recovery and a decline in the patient's quality of life [6]. The traditional nursing model often focuses only on the monitoring of patients' vital signs and basic medical operations, neglecting the patients' psychological state, rehabilitation guidance and other links, and there is no personalised plan for the postoperative patients' respiratory function exercise and limb activity recovery, making it impossible for the patients to carry out the rehabilitation activities well, thus affecting the speed of recovery. In terms of complication prevention, although traditional nursing also pays attention to observing the condition, it lacks initiative, and for common complications after cardiothoracic surgery like lung infection and deep vein thrombosis, it is only routinely monitored without sufficient preventive measures, making it difficult to effectively prevent related complications from occurring [7].

With the improvement of medical standards, the concept of integrated nursing intervention has emerged. The integrated nursing intervention model emphasises the care of patients from multiple dimensions, including preoperative psychological guidance and comprehensive assessment, intraoperative close cooperation and safety protection, postoperative monitoring of the condition, prevention of complications, guidance of rehabilitation training and life care, etc., aiming to optimise the patient's surgical experience, promote postoperative recovery, reduce the occurrence of complications, and improve the patient's quality of life through all-around, personalised nursing measures [8]. For patients undergoing cardiothoracic surgery with high risk, severe complications and poor recovery process, comprehensive nursing care can significantly reduce the risks associated with surgery, provide

a good guarantee for healing, and improve patients' postoperative recovery. At the same time, it can also increase the patient's knowledge of the disease and surgical treatment, as a way to enhance the patient's confidence in treatment, reduce lung infection, and improve the patient's prognosis <sup>[9]</sup>.

The results of this study showed that the respiratory function, complication rate and quality of life (QOL) score indexes of the observation patients were significantly better than those of the control group after receiving integrated nursing interventions ( $P < 0.05$ ). The reasons were analysed mainly due to the unique advantages of the integrated care model. Integrated care emphasises patient-centeredness, analyses nursing needs from multiple dimensions such as patients' physiology, psychology, and society, and organically integrates a variety of nursing methods so as to provide patients with whole, seamless, and high-quality nursing care services, thereby improving the overall quality of care <sup>[10–11]</sup>. Preoperatively, through a comprehensive assessment of the patient's physical condition, psychological state, etc., as well as the development of health education, the patient fully understands the surgical process, precautions, etc., so as to enhance the patient's confidence in the operation and recovery, so that he or she can cooperate with the treatment and nursing care in a more positive frame of mind <sup>[12]</sup>. During the operation, focus on close cooperation with the surgical team to ensure patient safety; in the postoperative care stage, not only focus on the patient's vital signs and wound care, but also pay attention to the prevention of complications, rehabilitation training, psychological support, and many other aspects of the management, so as to prevent the risk of postoperative complications.

In conclusion, the implementation of comprehensive nursing interventions for cardiothoracic surgery patients can effectively improve the patients' pulmonary function indexes, reduce the incidence of complications, improve the patients' quality of life, and have positive clinical promotion and application value.

## Disclosure statement

The authors declare no conflict of interest.

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# Analysis of the Causes of Hypoglycemic Reactions in Patients with Diabetic Nephropathy during the Peri-dialysis Period

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**Abstract:** *Objective:* To provide clinical evidence for controlling the incidence of hypoglycemia in patients with diabetic nephropathy during the peri-dialysis period by analyzing the causes of hypoglycemic reactions in diabetic patients during this period in our hospital. *Methods:* A total of 56 patients with diabetic nephropathy in the peri-dialysis period (i.e., glomerular filtration rate eGFR < 15ml/(min\*1.73 m<sup>2</sup>) up to three months after dialysis) who received outpatient, inpatient, and hemodialysis treatments in our hospital from June 2022 to December 2023 were selected as the research subjects. The occurrence of hypoglycemia in the non-dialysis period and the initial dialysis period of the patients was collected (hypoglycemia was judged according to Whipple's triad: a. Clinical manifestations: symptoms such as palpitation, sweating, blurred vision, dizziness, etc.; b. Blood glucose index ≤ 3.9 mmol/L; c. Hypoglycemic symptoms were relieved after sugar supply or food supplementation). The nutritional status, diabetes duration, fasting blood glucose (FBG), random blood glucose (RBC), glycated albumin (GA), glycated hemoglobin (HbA1c), blood cell analysis, renal function, regular diet, body mass index (BMI), oral hypoglycemic drugs, and injection hypoglycemic drugs of the patients with hypoglycemia were monitored. The influencing factors of hypoglycemia in the non-dialysis stage and the initial dialysis stage were analyzed respectively. *Results:* The incidence of hypoglycemia in patients in the non-dialysis stage was 5.3%, and that in the initial dialysis stage was 21%. The incidence of hypoglycemia in these two stages was negatively correlated with nutritional status, regular diet, fasting blood glucose (FBG), random blood glucose (RBC), glycated albumin (GA), glycated hemoglobin (HbA1c), and the dosage of hypoglycemic drugs, and was positively correlated with anemia and albumin (ALB). Among them, in the initial dialysis stage, glycated albumin (GA), random blood glucose (RBC), anemia, the dosage of injection hypoglycemic drugs, and the eating situation on the day of dialysis could predict the occurrence of hypoglycemic reactions. *Conclusion:* The incidence of hypoglycemic reactions in the initial dialysis stage was significantly higher than that in the non-dialysis stage, especially the hypoglycemia that occurred during the dialysis process seriously affected the dialysis effect of patients. Therefore, by improving the nutritional status of patients, regular diet, improving anemia, monitoring random blood glucose (RBC), glycated albumin (GA), and timely adjusting the dosage of hypoglycemic drugs, the occurrence of hypoglycemic reactions in patients with diabetic nephropathy during the peri-

dialysis period can be minimized.

**Keywords:** Diabetic nephropathy; Peri-dialysis period; Hypoglycemia

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## 1. Introduction

In China, diabetic nephropathy accounts for 20%–40% of all diabetic patients<sup>[1–2]</sup>. Affected by metabolism and along with the disease evolution process, the proportion of patients who need hemodialysis replacement therapy when they progress to stage 5 of chronic kidney disease also increases. Its complications have become more risk factors threatening the life and health of patients. Hypoglycemia, as the most common complication of diabetes, has a particularly prominent incidence in patients during the peri-dialysis period, seriously affecting the prognosis of the disease. Without timely intervention, it can even directly lead to loss of consciousness or death of patients. This study intends to analyze the causes of hypoglycemia in patients during the peri-dialysis period and provide clinical evidence for reducing the incidence of hypoglycemia in patients with diabetic nephropathy during the peri-dialysis period. The details are as follows.

## 2. Data and methods

### 2.1. Research subjects

A total of 56 patients with diabetic nephropathy in the peri-dialysis period (i.e., with a glomerular filtration rate  $eGFR < 15\text{ml}/(\text{min} \cdot 1.73\text{m}^2)$  up to three months after dialysis) who received outpatient, inpatient, and hemodialysis treatments in our hospital from June 2022 to December 2023 were selected as the research subjects. The patients were aged between 18 and 75 years old, had no infections, surgeries, or traumas in the past month, and had no primary or secondary dementia, schizophrenia, intellectual disabilities, consciousness disorders, or ketoacidosis. All patients received treatments such as hypoglycemic therapy, correction of anemia, and regulation of calcium-phosphorus metabolism disorder as prescribed by doctors. The study was reviewed and approved by the hospital ethics committee. The patients and their families were fully informed of the study content and signed the informed consent form.

### 2.2. Research methods

The peri-dialysis period of the patients was divided into the non-dialysis stage and the initial dialysis stage. The occurrence of hypoglycemic reactions in these two stages was collected respectively. The nutritional status, diabetes duration, fasting blood glucose (FBG), random blood glucose (RBC), glycated albumin (GA), glycated hemoglobin (HbA1c), blood cell analysis, renal function, regular diet, body mass index (BMI), oral hypoglycemic drugs, and injection hypoglycemic drugs of the patients with hypoglycemia were monitored.

### 2.3. Evaluation methods

Hypoglycemia was judged according to Whipple's triad: a. Clinical manifestations: symptoms such as palpitation, sweating, blurred vision, dizziness, etc.; b. Blood glucose index  $\leq 3.9\text{ mmol/L}$ ; c. Hypoglycemic symptoms were relieved after sugar supply or food supplementation. (2. Observation and Nursing of Hypoglycemic Reactions in



## 2.4. Statistical processing

In this study, SPSS18.0 statistical software was used to analyze the results. The statistical method adopted was the chi-square ( $\chi^2$ ) test. The significance level of the test was set at  $\alpha = 0.05$ , and a p-value  $< 0.05$  was considered statistically significant.

## 3. Results

The incidence of hypoglycemia in patients in the non-dialysis stage was 5.3%, and that in the initial dialysis stage was 21%. The incidence of hypoglycemia in these two stages was negatively correlated with nutritional status, regular diet, fasting blood glucose (FBG), random blood glucose (RBC), glycated albumin (GA), glycated hemoglobin (HbA1c), and the dosage of hypoglycemic drugs, and was positively correlated with anemia. Among them, in the initial dialysis stage, glycated albumin (GA), random blood glucose (RBC), anemia, the dosage of injection hypoglycemic drugs, and the eating situation on the day of dialysis were closely related to the occurrence of hypoglycemic reactions.

## 4. Discussion

In recent years, the number of diabetic patients with concurrent nephropathy who need hemodialysis replacement therapy has been increasing year by year. Insulin in the human body is metabolized through the liver and kidneys. However, due to kidney damage caused by diabetes, the inactivation of insulin in the body is reduced, which easily leads to the accumulation of insulin in the body and ultimately affects the blood glucose level of patients<sup>[3]</sup>. This study showed that more than half of the patients with renal failure in the non-dialysis stage complained of digestive tract symptoms such as loss of appetite, aversion to greasy food, and frequent nausea before starting hemodialysis treatment. Laboratory tests showed that glycated albumin (GA), random blood glucose (RBC), glycated hemoglobin (Hb), red blood cells (RBC), and albumin (ALB) were all lower than the normal values, while serum creatinine (SCr) and blood urea nitrogen (BUN) were abnormally high, and the glomerular filtration rate eGFR was less than 15ml/(min\*1.73 m<sup>2</sup>). Therefore, the gastrointestinal reactions caused by renal failure, which directly affect the insufficient nutritional intake of patients, are the leading factors. In addition, various complications such as emotional instability and anemia caused by nephropathy itself affect the daily lifestyle of patients, resulting in untimely blood glucose monitoring and adjustment of hypoglycemic drugs. The co-existence of these factors can lead to hypoglycemia in some patients.

Some studies have confirmed that when hemodialysis is performed with sugar-free dialysate, the glucose loss is approximately 5.5 grams per hour, and hypoglycemic reactions are prone to occur 2 hours before dialysis (consistent with the results of this study). This study showed that most of the diabetic nephropathy patients in the initial dialysis stage had hypoglycemic reactions during the induction dialysis stage. 35% of the patients had concurrent hypotension when hypoglycemic reactions occurred. The incidence of hypoglycemia in patients using short-acting hypoglycemic drugs was 10.5% higher than that in patients using long-acting hypoglycemic drugs. Fasting blood glucose (FBG), random blood glucose (RBC), glycated albumin (GA), and glycated hemoglobin (HbA1c) were all at a normal but relatively low level. During the induction dialysis stage, the clearance rates of serum creatinine (SCr) and blood urea nitrogen (BUN) decreased, but the previous accompanying digestive tract

symptoms had not been significantly relieved, and patients still did not have a regular diet. The combined effect of these two factors led to a higher incidence of hypoglycemia in patients. The higher incidence of asymptomatic hypoglycemia in the initial dialysis stage of patients was consistent with the research of Wei Jun et al., that is, when patients had symptoms such as palpitation, sweating, blurred vision, and dizziness during dialysis, the measured blood glucose was  $\leq 3.5$  mmol/L.

The incidence of hypoglycemic reactions in diabetic nephropathy patients is relatively high when the glomerular filtration rate is less than  $15\text{ml}/(\text{min} \times 1.73\text{ m}^2)$ . A severe hypoglycemic reaction or a cardiovascular event triggered by it may offset the benefits of maintaining normal blood glucose before, and even threaten life [4]. This study found that monitoring patients' fasting blood glucose (FBG), random blood glucose (RBC), and glycated albumin (GA) can partially predict the probability of patients having hypoglycemia. Adjusting the usage time and dosage of hypoglycemic drugs in a timely manner according to the patients' diet or correcting patients' malnutrition can prevent the occurrence of hypoglycemic reactions in the initial dialysis stage. Due to the varying degrees of edema in some patients, the body mass index has a relatively small impact on the incidence of hypoglycemia. Strengthening inspections during hemodialysis, providing targeted education, and improving patients' self-management level can reduce or avoid the occurrence of hypoglycemia [5]. Due to factors such as single-center and short-time span, this study only made a preliminary exploration. How to reduce the hypoglycemic reactions in peri-dialysis patients still needs further exploration by scholars.

## Disclosure statement

The authors declare no conflict of interest.

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# Construction and Application of Ideological and Political Case Base in Pediatric Nursing Clinical Teaching

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**Abstract:** Objective: To establish the ideological and political case database of pediatric clinical nursing teaching, integrate the ideological and political concept of the curriculum into the clinical practice teaching, and provide teaching materials for cultivating pediatric nursing talents with comprehensive quality. Methods: Collect pediatric clinical nursing cases with ideological and political elements through consulting Wanfang and CNKI databases and the Internet. Through the expert demonstration, the formation of the course ideological and political case database. And through the combination of online and offline teaching methods, ideological and political elements into clinical nursing teaching. Results: Six chapters of pediatric nursing ideological and political cases were preliminarily constructed, and the pediatric nursing clinical teaching case database containing six ideological and political elements, and achieved good results in the clinical practice training of nursing interns in 2025. Conclusion: The construction and application of ideological and political case bank in pediatric nursing clinical teaching is conducive to improving the willingness of nursing students care, humanistic care ability and learning effect; it helps nursing students to establish correct values and improve students professional quality and recognition, with high clinical promotion and application value.

**Keywords:** Ideological and political; Case database; Pediatric nursing; Clinical teaching

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## 1. Introduction

With the deepening of educational reform, the integration of ideological and political education and professional education has become an important direction of educational development. In 2020, the Ministry of Education issued the Guidelines for Ideological and Political Construction of Courses in Higher Education <sup>[1]</sup>. It is pointed out that moral education should adhere to the trinity of “value shaping, knowledge transmission and ability cultivation”, and professional courses should share the same direction with ideological and political courses

to play a synergistic effect. Nursing is a very practical discipline, and pediatric nursing requires nurses to have strong humanistic care and communication skills, and ideological and political elements should be permeated into the nursing work environment, to effectively guide the nursing staff to implement humanistic care, enhance the communication between nurses and patients, the implementation of holistic nursing <sup>[2]</sup>. In the clinical teaching of pediatric nursing, the construction of ideological and political case base and applying it to teaching practice is of great significance for cultivating students professional quality and ideological and political quality. The nursing object of pediatric clinical practice is special, which requires high technical requirements, communication and judgment thinking ability, and the difficulty of pediatric nursing practice teaching is much higher than that of other adult departments. Nursing clinical practice stage is the most critical stage of nursing education, but also the basis of work after graduation. Today's society has an urgent need for innovative and practical pediatric nursing talents <sup>[3]</sup>.

## **2. The significance of the construction of ideological and political case database**

The significance of the construction of ideological and political case base lies in providing vivid, specific and close to practical teaching resources for ideological and political education. By collecting and sorting out various representative ideological and political cases, the teaching content can be enriched and students learning interest and participation can be improved. The construction of case base can help teachers to better combine theory with practice, and enhance the pertinency and effectiveness of teaching. At the same time, the establishment of the case bank is also conducive to promoting the innovation and development of ideological and political courses, providing a platform for teachers to communicate and learn, and promoting the professional growth of teachers. In addition, the construction of the case bank can also provide schools and the society with shared ideological and political education resources, and strengthen the popularization and promotion of ideological and political education.

## **3. Principles of the construction of ideological and political case database**

Ideological and political case bank construction should adhere to the correct political direction, Ensure that the content of the case conforms to the core socialist values; Focus on practicality, Cases should be derived from the clinical practice, Close to the student life, Easy to understand and accept; Emphasis on the educational nature, Cases should have a clear ideological and political education goal, Can effectively promote the improvement of students ideological and political quality, Can guide the students to form the correct values; Keep the time going, Case content should keep pace with the times, Reflecting the characteristics of The Times and the needs of social development, Can reflect the characteristics and challenges of pediatric nursing work; Ensure that the scientific nature, Case analysis needs to be accurate, Ensure that the content is authentic and practical, According to the law of education and teaching; Focus on openness, The case library should be constantly updated, To absorb the new cases, Form an open resource system; And has the operability, Easy for teaching teachers to use it flexibly in clinical teaching, Easy for students to understand and discuss.

## **4. Composition of the ideological and political case database content**

Based on course education teaching objectives, select the ideal faith, scientific spirit, professional quality as pediatric clinical nursing teaching education elements, combined with the literature analysis and pediatric clinical

nursing teaching content and characteristics, according to the nursing clinical practice teaching plan, establish fit characteristics of pediatric clinical nursing education teaching theory framework, through the ideological material and into the path (video integration, text, case discussion, scenario simulation), collect related courses ideological material, such as news events, side model, video, case, the integration of ideological material and ideological elements, multiple path into (Table 1). Through case teaching, bedside teaching method, scenario simulation and other teaching methods, nursing students are taught, so as to achieve the ideological and political goals of firm ideals and beliefs, stimulating the feelings of the country, enhancing the awareness of the rule of law, cultivating scientific spirit, and improving professional quality.

**Table 1.** Teaching design of politics-oriented pediatric clinical nursing practice

Clinical teaching course content in pediatric nursing	Knowledge point	Ideological and political elements	Ideological and political goals	Ideological and political material	Teaching method
pediatric nursing	Child Health Assessment	Good at observation	patriotism	History of pediatric nursing development	Story teaching method
Department of Pediatrics nursing	Pediatric intravenous infusion technology	safety consciousness	ideal and faith	Successful case sharing of difficult venipuncture in children	Case teaching method and scenario simulation method
Pediatric surgery nursing	aseptic technique	Self-cultivation	professional quality	The development history of aseptic technology and the deeds of nurses consciously observing aseptic technology in clinical work	case system
First aid care for children	CPR, resuscitation airbag used	group spirit	ideal and faith	Successful cases of cardiopulmonary resuscitation in dying children	case system
Neonatal care	Neonatal care	Mothers love spirit	ideal and faith	The latest neonatal nursing technology and research progress	Bedside teaching method
Critical care for children	Sputum method, oxygen inhalation method	heal the wounded and rescue the dying	scientific spirit	Care of frontline nurses for critically ill patients during the outbreak	Story teaching method, case teaching method

## 5. Application of ideological and political case bank in the clinical practice teaching of pediatric nursing

### 5.1. Dig deep into the ideological and political elements in the clinical practice teaching of pediatric nursing

Integrate the cases into the course syllabus, serve as the materials for the clinical practice teaching and discussion, and guide the students to use the knowledge they have learned in the clinical practice work.

In addition to the integration of cases, it is also essential to emphasize the importance of reflective practice in pediatric nursing education. Encouraging students to reflect on their experiences in the clinical setting can deepen their understanding of the ideological and political aspects of nursing care. This can be achieved through structured reflection sessions where students are prompted to consider how their actions and decisions are influenced by the broader societal and ethical considerations in healthcare.

Furthermore, the curriculum should be designed to include interactive workshops that simulate real-life scenarios. These workshops can provide a safe environment for students to discuss and debate the ideological and political issues they may encounter in their future careers. Role-playing exercises, for instance, can help students navigate complex situations involving patient advocacy, cultural sensitivity, and ethical dilemmas, thereby preparing them to act with empathy and professionalism in diverse clinical contexts.

To ensure that the ideological and political dimensions of pediatric nursing are not overlooked, it is crucial to incorporate the perspectives of various stakeholders, including patients, families, and healthcare professionals from different backgrounds. This can be done through guest lectures, panel discussions, and collaborative projects that expose students to a wide range of viewpoints and experiences. By doing so, students will gain a more holistic understanding of the challenges and responsibilities that come with providing care in a multicultural society.

Lastly, the evaluation methods should be aligned with the educational goals of incorporating ideological and political elements into pediatric nursing clinical practice teaching. Assessments should not only measure the students' clinical skills and knowledge but also their ability to critically analyze and respond to the ideological and political issues they face in practice. This could involve written assignments, presentations, and portfolios that require students to demonstrate their understanding and application of these concepts in a practical setting.

## **5.2. Optimize teaching methods and means**

Adopt online and offline mixed teaching, case teaching, group discussion and other teaching methods to stimulate students interest and enthusiasm in learning.

Enhance the practical application of knowledge: Encourage students to participate in clinical practice and simulation exercises, allowing them to apply theoretical knowledge in real-world scenarios and improve their problem-solving skills.

Strengthen the assessment of critical thinking: In addition to traditional exams, introduce more open-ended questions and scenarios that require students to think critically and provide evidence-based solutions, thereby assessing their ability to analyze and make decisions.

Encourage interdisciplinary learning: Promote the integration of medical knowledge with other disciplines such as ethics, law, and social sciences, helping students to understand the broader context of healthcare and develop a more holistic perspective.

Develop a continuous learning culture: Foster an environment where students are encouraged to engage in lifelong learning, providing resources and opportunities for them to stay updated with the latest developments in their field.

Strengthen mentorship and guidance: Assign mentors to students to provide personalized guidance and support, helping them navigate their academic and professional development.

### **5.2.1. Through simulation teaching, situational simulation and other methods, students can personally experience the process of holistic nursing and nurse-patient communication, and improve their clinical thinking ability and humanistic care awareness**

Moreover, the integration of technology in nursing education cannot be overstated. Utilizing advanced tools such as virtual reality (VR) and augmented reality (AR) can provide students with immersive learning experiences that mimic real-life scenarios. These technologies can simulate complex medical procedures and emergency situations, allowing students to practice and refine their skills in a controlled, risk-free environment.

Additionally, fostering a continuous learning culture is essential. This involves creating an atmosphere where students are motivated to pursue lifelong learning, not just during their formal education but throughout their careers. Educational institutions should provide access to online databases, journals, and workshops that keep students abreast of the latest research and trends in nursing. This ensures that when they enter the workforce, they are not only competent but also prepared to adapt to the evolving healthcare landscape.

Strengthening mentorship and guidance is another critical aspect of modern nursing education. Mentors play a pivotal role in shaping the future of nursing by offering personalized advice, sharing their professional experiences, and helping students to set and achieve their academic and career goals. Regular mentorship sessions can help students navigate challenges, make informed decisions, and build a professional network that will be invaluable as they progress in their careers.

Finally, as we look to the future, it is clear that the nursing profession will continue to evolve. New technologies, treatments, and methodologies will emerge, and nurses will need to be adaptable and well-equipped to meet these changes head-on. By emphasizing simulation teaching, technology integration, continuous learning, and mentorship, we can prepare the next generation of nurses to provide exceptional care and contribute to the advancement of healthcare.

### **5.2.2. Through the analysis of pediatric nursing clinical cases, students are guided to think about medical ethics, patients rights and interests and other issues, and cultivate their sense of professional responsibility and mission**

Moreover, the integration of interdisciplinary knowledge is crucial for the comprehensive development of nursing students. By incorporating insights from psychology, sociology, and public health, future nurses can better understand the holistic needs of patients and their families. This multidimensional approach not only enhances patient care but also fosters a more empathetic and effective nursing practice.

As we look to the future, it is imperative that nursing education continues to evolve in tandem with technological advancements. The incorporation of telehealth and mobile health applications into the curriculum will enable nurses to provide remote care and manage patient data efficiently. This will be particularly important in addressing the healthcare needs of remote and underserved communities, ensuring that quality care is accessible to all.

Finally, fostering a culture of research and evidence-based practice within nursing education will empower future nurses to contribute to the body of knowledge that drives the profession forward. Encouraging students to engage in research projects, critically appraise literature, and apply the latest evidence to their clinical practice will ensure that nursing remains at the forefront of healthcare innovation.

## **5.3. Strengthen the construction of teachers**

Uniformly conduct ideological and political case teaching and training for clinical teachers through online and offline training methods. Make the teachers skillfully use the ideological and political case bank teaching materials, unified teaching methods, improve the teaching level

### **5.3.1. Organize teachers to participate in training and seminars to improve their ideological and political education awareness and ability**

Continue to enhance the professional development of teachers by encouraging them to engage in continuous learning and research. This will not only broaden their horizons but also foster a deeper understanding of the latest



trends in ideological and political education.

Encourage teachers to actively participate in academic exchanges and collaborative teaching projects with other institutions. Through these interactions, they can share experiences and innovative teaching methods, thereby enriching their own teaching practices.

Implement a mentorship program where experienced teachers guide and support less experienced colleagues. This will help to ensure that the knowledge and skills of the teaching staff are consistently upgraded and maintained at a high level.

Regularly assess the effectiveness of the training programs and teaching methods through feedback from students and peer reviews. Use these insights to refine and adjust the training content and teaching strategies to better meet the needs of the students and the evolving educational landscape.

### **5.3.2. Encourage teachers to actively participate in relevant research and practical work, and apply their rich experience and knowledge to teaching**

By fostering a culture of continuous professional development, educators can stay abreast of the latest pedagogical trends and innovations. This not only enhances their own teaching skills but also enriches the learning environment for students.

Moreover, it is essential to establish a collaborative environment where teachers can share their experiences and insights with one another. This exchange of ideas can lead to the creation of new teaching methodologies that are more effective and engaging for students.

Finally, it is important to recognize and reward the efforts of teachers who go above and beyond in their professional development and the application of new teaching methods. Such recognition can serve as an inspiration for others and help to sustain a positive momentum in the educational community.

## **6. Continuous update and improvement of the case library**

### **6.1. Collect and update the cases from the clinic regularly to ensure the era and frontier of the content of the case library. According to the teaching feedback and student needs, constantly optimize the structure and content of the case library**

Moreover, it is essential to foster a collaborative environment where educators and practitioners can share insights and experiences. This can be achieved by organizing workshops and seminars that focus on the latest trends in medical education and patient care. By doing so, the case library will not only be a repository of information but also a dynamic platform for professional development and knowledge exchange.

To further enhance the case library, it is advisable to integrate multimedia elements such as videos, animations, and interactive simulations. These resources can provide a more immersive learning experience, allowing students to visualize complex medical procedures and patient interactions. The integration of technology should be a continuous process, keeping pace with advancements in educational technology and ensuring that the case library remains an innovative tool for medical education.

Finally, it is crucial to establish a feedback loop with the end-users of the case library—students and educators. Regular surveys and feedback sessions can provide valuable insights into the effectiveness of the cases and the overall user experience. This feedback should be used to make iterative improvements, ensuring that the case library continues to serve as a valuable asset in medical education.

By following these strategies, the case library can be continuously updated and improved, reflecting the latest

medical knowledge and teaching methodologies. This will not only benefit current students and educators but also set a foundation for future generations of medical professionals.

## **6.2. Encourage teachers and students to participate in the preparation and evaluation of cases to improve the practicability and educational effect of the case library**

By actively involving both educators and learners in the creation and assessment of case studies, the library can be enriched with diverse perspectives and practical insights. This collaborative approach not only enhances the relevance of the cases but also fosters a sense of ownership and engagement among participants.

Moreover, incorporating feedback mechanisms will allow for continuous refinement of the case library. After each use, teachers and students can provide valuable input on the effectiveness of the cases, suggesting improvements or identifying areas that require further development. This feedback loop ensures that the library remains dynamic and responsive to the evolving needs of medical education.

Additionally, it is crucial to establish a system for regularly reviewing and updating the content of the case library. As medical science advances and new treatments and technologies emerge, it is essential that the case library reflects these changes. This can be achieved through periodic reviews conducted by a panel of experts who can assess the currency and accuracy of the cases and recommend updates as necessary.

Finally, the case library should be made accessible to a wider audience beyond the immediate institution. By sharing the cases through online platforms and medical education networks, the library can reach a global community of medical professionals and students. This not only increases the impact of the library but also encourages international collaboration and knowledge exchange.

Looking ahead, the case library has the potential to become a cornerstone of medical education, continually evolving to meet the challenges of the future. As we embrace new technologies and teaching methods, the case library can adapt to incorporate virtual reality simulations, interactive multimedia elements, and other innovative tools that enhance the learning experience. The future of the case library is bright, and with the right strategies in place, it will continue to be an indispensable resource for medical education.

## **7. Summary and outlook**

Curriculum thinking and politics is an important measure in China's education reform, aiming to cultivate the young generation with a high sense of social responsibility and ethical concepts. As one of the highly specialized and socially responsible fields, medical education especially needs to integrate the curriculum ideological and political ideas into it. Curriculum ideological and political case base is the main tool for the collaborative education of specialized courses and ideological and political courses. Building a perfect curriculum ideological and political teaching case base is the key and key to practice the curriculum ideological and political teaching reform. The exploration and practice of pediatric nursing clinical teaching oriented by curriculum thinking and politics is an important educational topic. By deeply excavating the ideological and political elements in pediatric curriculum, optimizing teaching methods and means, strengthening the construction of teachers and carrying out practical activities, we can lay a solid foundation for cultivating high-quality pediatric nursing talents with both integrity and ability. However, how to organically integrate curriculum ideological and political ideas into pediatric clinical teaching, this process requires continuous exploration and practice to find the most suitable way and method for clinical teaching of pediatric nursing. In the future, we can further strengthen the construction of teachers, optimize

teaching methods and means, carry out more practical activities and other aspects of exploration and practice, in order to cultivate more high-quality pediatric nursing talents with both integrity and ability.

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## Disclosure statement

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# Clinical Analysis of Effective Prevention and Control of Hospital-acquired Infections in Fever Outpatient Clinics

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**Abstract:** *Objective:* To explore the key role of fever clinic in the prevention and control of hospital-acquired infections. *Methods:* To summarize the implementation of the infectious disease reporting process, standardized operating procedures, infection monitoring system, disinfection and isolation measures, and medical waste management system in a general hospital in Zhangjiagang City, Jiangsu Province, since the establishment of the fever outpatient clinic. Through retrospective analysis, we compared the changes in the incidence of hospital infections, patient satisfaction, and healthcare personnel satisfaction before and after the establishment of the fever clinic, and explored the important role of the fever clinic in improving the hospital infection prevention and control capacity and service quality. *Results:* Since the establishment of the fever clinic, the incidence of hospital infections has significantly decreased to 8.0%, patient satisfaction has increased to 96.0%, and healthcare personnel satisfaction has increased to 92.3%, compared with 36.0%, 72.0%, and 69.2% before the establishment of the fever clinic, and all the indexes in 2023 were significantly better than those in 2006, and the statistical analysis showed that this improvement was significant ( $P < 0.05$ ). *Conclusion:* By assigning professional infection control nurses to be responsible for the care of central venous catheters in ICUs, the risk of catheter-related bloodstream infections in patients can be significantly reduced. This measure is essential to ensure the smooth progress of the treatment process and improve the prognostic status of patients.

**Keywords:** Fever clinic; Prevention and control; Hospital-acquired infections; Effectiveness

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## 1. Introduction

Hospital-acquired infections, also known as hospital-acquired infections, are infections that are newly acquired while a patient is receiving inpatient care. Such infections include not only pathogens suffered directly by the patient in the hospital, but also cases in which the patient is exposed to pathogens in the hospital but develops symptoms only after being discharged from the hospital <sup>[1]</sup>. It is worth noting that the definition of hospital-

acquired infections explicitly excludes situations in which the patient is in the incubation period of the infection prior to admission or in which the infection has already begun to develop at the time of admission. The risk of hospital-acquired infections to patients' health cannot be ignored. It may not only aggravate the patient's original condition and prolong the treatment cycle, but also cause physical dysfunction and even threaten the patient's life in serious cases. Therefore, the prevention and control of hospital-acquired infections is particularly important.

The frequency of hospital-acquired infections has become an important indicator of the quality of medical care and management of medical institutions. An efficient healthcare organisation should have strict infection control measures to ensure patient safety during treatment. This includes, but is not limited to, strengthening hand hygiene management for healthcare workers, improving the cleanliness of the ward environment, rationalising the use of antibiotics, and improving the hospital infection surveillance and reporting system. In addition, healthcare organisations need to continuously improve healthcare staff's understanding of hospital-acquired infections and their ability to prevent and control them, and enhance the awareness of prevention and control among all staff through education and training. At the same time, strengthen the communication with patients and their families, popularise the knowledge of hospital infection, and jointly build a safe and secure medical environment. In conclusion, the prevention and control of hospital infection is a systematic project that requires the joint efforts of healthcare institutions, healthcare workers, patients and their families in order to reduce the incidence of hospital infections, safeguard the health of patients, and improve the quality of healthcare services.

Since the establishment of a special fever clinic in a general hospital in Zhangjiagang City, Jiangsu Province, the hospital has made significant progress in combating hospital-acquired infections and accumulated a lot of practical experience. Through a series of scientific, rigorous prevention and control measures, the hospital has successfully reduced the incidence of hospital-acquired infections to a lower level, effectively protecting the health and safety of patients. The following is a detailed report of the hospital's work and achievements in the construction of fever clinic, hospital infection management, and patient care quality improvement.

## **2. Information and methods**

### **2.1. General information**

Fever clinic, as a crucial part of medical institutions, its staff structure and hardware facilities are designed to ensure the continuity, efficiency and safety of medical services. The following is a detailed description of its refined management model, aiming to show its key role in improving the quality of medical services, patient satisfaction, and the prevention and control of infectious diseases. In terms of staffing, the leadership of the fever clinic consists of an experienced director, a capable deputy director and a professional nurse manager. They not only possess in-depth professional knowledge, but also have high coordination and guidance skills at the management level to ensure the orderly operation of the whole team. The team consists of three specialist attending physicians with professional background, three skilled general practitioners and nine highly trained nurses, who together form the core medical force of the Fever Clinic and are committed to providing patients with high standard and quality medical services.

In order to ensure the cleanliness of the medical environment and the timely supply of materials, the Fever Clinic is specially equipped with full-time cleaning staff and delivery staff, whose work is crucial to maintaining the daily operation of the clinic. In terms of hardware facilities, the Fever Clinic is equipped with state-of-the-art medical equipment, including one resuscitation bed, three observation beds, six observation beds and two separate



consultation rooms. These facilities are designed with full consideration of patients' medical needs and can provide appropriate observation and treatment conditions for patients with different conditions. Resuscitation beds ensure rapid treatment in emergency situations, observation beds and beds provide continuous monitoring and treatment for patients, and the separate consultation rooms greatly enhance patient privacy and experience.

The establishment and efficient operation of the Fever Clinic not only significantly improves the quality of healthcare services and patient satisfaction, but also plays an irreplaceable role in infectious disease screening, early diagnosis and hospital infection control. Its core responsibilities include strictly adhering to the guidance and supervision of the CDC organisations and following through with disease prevention and control tasks. This covers hospital-wide professional diagnosis and treatment and isolation and observation of febrile patients, patients with intestinal diseases, patients with surgical special infections and patients with suspected infectious diseases. In the handling of public health events, the Fever Clinic plays a vanguard role, and is able to respond quickly and effectively control the spread of infectious diseases to protect the health and safety of patients and healthcare workers. At the same time, the fever clinic maintains a close partnership with the hospital infection and disease control department to jointly develop and implement infection control measures to ensure that the risk of hospital-acquired infections is managed scientifically and effectively.

In the context of a general hospital in Zhangjiagang City, Jiangsu Province, this study aimed to compare the changes in the incidence of hospital-acquired infections in the two periods and to assess the improvement in patient satisfaction by conducting an in-depth retrospective analysis of 25 inpatients in each of the years 2006 and 2023. In addition, the study also compared the satisfaction of healthcare professionals in 13 cases in each of the two years to gain a comprehensive understanding of the effectiveness of the fever clinic in improving the quality of healthcare services and patient experience. These analyses provide a clearer picture of the important role of the fever clinic in the prevention and control of hospital-acquired infections and its positive impact on the overall improvement of the healthcare environment.

## 2.2. Methods

(1) In the process of building a modern medical service system, the establishment of the fever clinic, the optimisation of the departmental layout and the improvement of the management system are the key links in improving the quality of medical services and the ability to prevent and control infectious diseases. The following is a detailed description of the comprehensive construction of the fever outpatient clinic, aiming to show its scientific and professional nature in the medical process. The planning of the fever outpatient clinic takes full account of the needs of the medical process and is carefully divided into three key functional areas to ensure the efficiency of medical operations and patient safety <sup>[2]</sup>.

The design of the reception area reflects the importance placed on the patient experience. The area includes a convenient entrance, an efficient registration desk, a professional triage desk, a spacious and comfortable waiting hall, a consultation room with good privacy, a standardized blood collection room, a fully functional dispensing room, a well-equipped infusion room and an emergency resuscitation room. Such a layout ensures that the whole process of patients from entering the clinic to receiving treatment is smooth and convenient, fully reflecting the concept of humane medical services. The observation area is specially designed for patients who need to be isolated for observation, and independent negative pressure isolation wards have been set up. Each ward is equipped with a telephone call system so that patients can communicate with medical staff in time. At the same time, the wards are equipped with sufficient disinfection and cleaning supplies to ensure that patients receive

effective medical supervision and enjoy a safe living environment during the observation period.

Thirdly, the working area for medical and nursing staff strictly follows standardized medical management and is divided into contaminated, semi-contaminated and clean areas. This zoning design effectively reduces the risk of cross-infection and ensures the safety of healthcare workers in the performance of their duties. Within the Fever Clinic, in order to improve the efficiency of medical treatment, clear and unambiguous signage and floor markings can be seen everywhere. They provide accurate guidance for patients and staff, and help to reach the destination quickly and accurately. In addition, the department is constantly optimising its management system, which covers a wide range of aspects such as medical waste disposal, disinfection and isolation, disinfection and sterilisation, as well as environmental hygiene monitoring, to ensure standardization of medical operations and patient safety. Regular monthly inspections and scores are not only a comprehensive review of the department's operation, but also a verification of the effectiveness of the management system. By feeding back the inspection results to the relevant departments, the department is able to summarize its experience and identify deficiencies in a timely manner, and adjust and improve the management system accordingly to promote its development towards standardization and scientification.

(2) In medical institutions, improving the process of reporting infectious diseases and strengthening the management of patients with infectious diseases are key measures for the prevention and control of hospital-acquired infections. The standardization and normalisation of this process is the basis for achieving effective prevention and control. The following is an in-depth description of the process, aiming to highlight its important role in maintaining public health safety. To ensure that medical staff are proficient in the operation of the infectious disease reporting system, the hospital has adopted the measure of distributing infectious disease report cards to each consultation room one by one. The aim is to ensure that every doctor is able to complete the report card accurately and meticulously when attending to patients with infectious diseases and suspected infectious diseases, which is not only responsible for the health of patients, but also an important contribution to public health safety.

Completion of the infectious disease report card covers the patient's name, date of consultation, disease diagnosis, clinic number, names of doctors and nurses on duty, and information about the card recipient. This detailed information is a key element in tracking disease dynamics and formulating prevention and control strategies. Doctors must ensure the accuracy and completeness of the information during the completion process. After completing the report card, the hospital designates a special person in charge of promptly sending the report card to the public health department. The timeliness of this link is crucial for subsequent monitoring and analyses, and facilitates rapid response to possible public health incidents.

In addition, the hospital has established an elaborate record-keeping system which ensures that all information related to infectious diseases is properly recorded and maintained. The strict implementation of this process not only enhances the hospital's professionalism in managing infectious disease patients, but also provides solid data support for the prevention and control of hospital-acquired infections. Through these standardized and regulated measures, hospitals are able to identify and control infectious agents more effectively, thereby safeguarding the health and safety of patients and healthcare workers. At the same time, the optimisation of this process also improves the overall service quality of hospitals and enhances their ability to cope with the challenges of infectious diseases. In summary, improving the infectious disease reporting process and strengthening patient management are important components of hospital infection prevention and control, and are of far-reaching significance to the maintenance of social public health safety.

(3) In the healthcare environment, optimisation of the disinfection and isolation system and proper disposal

of medical waste are key measures for the prevention of hospital-acquired infections. The following is a detailed description of the strategies adopted by the Hospital in these two areas, with the aim of demonstrating its efforts to improve medical safety and service quality. In order to raise the awareness of and compliance with aseptic practices among healthcare workers, the Hospital has adopted a series of educational and management measures. It organises in-depth study of medical codes of conduct and operating procedures for all healthcare staff to strengthen the concept of aseptic operation. On this basis, the Hospital has established a set of strict standards for the assessment of aseptic operation techniques and has incentivised healthcare workers to pay more attention to the necessity of aseptic operation through the implementation of a system of economic rewards and penalties. This institutionalised management tool aims to ensure that healthcare workers consciously comply with the regulations related to aseptic operation in their daily work, thereby reducing the risk of hospital-acquired infections.

The staffing of the fever clinic has been carefully planned and designed. The leadership consists of an experienced director, a capable deputy director, and a highly professional nurse manager, who together are responsible for the coordination and guidance of the healthcare team. The team consists of three attending specialists, three general practitioners and nine well-trained nurses, who form the core medical strength of the Fever Clinic. In addition, specially equipped cleaning staff and delivery staff are responsible for the cleaning of the environment and the timely replenishment of supplies, respectively, providing logistical support for the efficient operation of the Fever Clinic. The establishment and continuous improvement of this professional team provides a solid human resource guarantee for the prevention and control of hospital infections. Through the strict disinfection and isolation system and aseptic operation norms, our hospital effectively maintains the safety of the working environment for healthcare workers while safeguarding the health of patients and improving the quality of medical services.

(4) In fever clinics, the proper use of personal protective equipment (PPE) is essential for healthcare workers to prevent hospital-acquired infections. Healthcare workers need to choose the appropriate masks, such as N95 masks or medical surgical masks, according to the type of patients they are exposed to and the risk of operations, and ensure that the masks cover the nose, mouth and chin without gaps, and are replaced as soon as they become wet or contaminated. Wear appropriately sized gloves when coming into contact with patient's blood, body fluids, secretions or performing invasive procedures and replace gloves as soon as they are torn or contaminated, followed by hand hygiene. During operations that may produce splashing or spraying, such as blood sampling, tracheal intubation, etc., healthcare workers should wear goggles or face masks and ensure clear vision, and clean and sterilise them as required after use. When handling patients with highly contagious diseases or operations with risk of splashing, protective clothing covering the head, neck and feet should be worn and put on and taken off correctly in designated areas.

To ensure the effective use of PPE, the hospital organises regular theoretical training covering types of PPE, their uses, donning and doffing methods, etc., emphasising their importance in the prevention of hospital-acquired infections. Practical exercises allow healthcare workers to practice donning and doffing PPE through simulated work scenarios, with instructors immediately correcting errors and providing correct demonstrations. The skills of healthcare workers in using PPE are assessed through tests to ensure that everyone is able to operate it correctly and skilfully. In addition, the hospital regularly updates the guidelines and standard operating procedures for the use of PPE, and encourages healthcare workers to participate in continuing education courses in order to acquire the latest knowledge of protection and improve self-protection.

(5) In fever clinics, careful management of patients, especially those with suspected or confirmed

infectious diseases, is essential for effective prevention and control of hospital-acquired infections. This involves immediately directing patients to clearly labelled isolation areas, ensuring that they are effectively segregated from other patients and visitors, and requiring healthcare workers to wear full personal protective equipment and strictly follow protocols for entering and exiting isolation areas. For highly infectious diseases such as TB, SARS, MERS or COVID-19, patients will be treated in isolation in single rooms equipped with the necessary medical equipment and amenities to minimise contact with others. In addition, for diseases with different modes of transmission, such as airborne, droplet and contact transmission, appropriate isolation measures, such as air filtration, maintaining social distance and the use of masks, as well as cleansing and disinfection of objects touched by the patients, are adopted.

At the same time, health education for patients is an indispensable part. Patients should be educated about the disease, including the condition, the means of transmission, the importance of isolation and treatment as well as possible complications, and be provided with relevant publicity materials. Educate patients on basic protective measures such as how to properly wear masks, perform hand hygiene and avoid close contact, as well as the use of tissues or elbows to cover their mouths and noses when coughing or sneezing, so as to minimise the spread of pathogens. In addition, psychological support and counselling are provided to help patients cope with the anxiety and loneliness that may be associated with isolation treatment. Through good doctor-patient communication, it is ensured that patients are aware of the treatment process and prognosis, so as to enhance their confidence in treatment. In terms of life guidance, patients are instructed on how to maintain good personal hygiene habits during isolation and are provided with the necessary daily necessities to ensure their quality of life.

In conclusion, through this series of comprehensive measures, the fever clinic not only effectively reduces the risk of hospital-acquired infections, but also enhances patients' awareness of self-protection and treatment compliance, creating favourable conditions for patients' recovery.

(6) At the fever clinic, maintaining respiratory hygiene is essential in order to effectively prevent the spread of respiratory diseases. A series of measures have been taken to educate patients and health care workers on the proper handling of coughing and sneezing behaviour, and to ensure an adequate supply and proper use of medical waste containers. Specifically, it is taught that when coughing or sneezing, tissues should be used to cover the mouth and nose in preference to the inside of the elbow if tissues are not available to avoid direct covering with the hands, thereby reducing the spread of pathogens in droplets to others. Used tissues must be discarded immediately and followed by hand hygiene to maintain personal and environmental cleanliness. Live demonstrations and interactive exercises are used to ensure that these correct coughing and sneezing postures are fully understood and performed by patients and healthcare workers. At the same time, easily identifiable containers clearly labelled as 'clinical waste' were placed in key areas of the fever clinic, including waiting areas, examination rooms, treatment rooms and wards, to collect potential contaminants such as used tissues, masks, etc. It was emphasised that these wastes should not be thrown away. It is emphasised that these wastes should not be disposed of in ordinary rubbish bins to prevent the spread of pathogens. In addition, medical waste containers are regularly checked for overflow and replaced in a timely manner in accordance with hospital regulations to ensure that all medical waste is disposed of safely and correctly in accordance with national and local regulatory requirements. These comprehensive measures help reduce the risk of respiratory disease transmission and safeguard the safety of patients and healthcare workers, and are an important part of respiratory hygiene management in fever clinics.

The following is a detailed report on the specific practice and effectiveness of the fever clinic in a general hospital in Zhangjiagang City, Jiangsu Province, in reducing the incidence of hospital-acquired infections and



improving the satisfaction of patients and healthcare workers since its establishment <sup>[3]</sup>. Through this series of efforts, not only has the safety and quality of medical services been significantly improved, but also a safer and more reliable medical environment has been created for patients.

## 2.3. Statistical methods

In this study, the collected data were rigorously processed and analysed, and this process was completed using SPSS 13.0 statistical software. In order to explore whether the differences in rates between different groups were statistically significant, the statistical method of  $\chi^2$  test (Chi-square test) was used. During the analysis, a P value of less than 0.05 was used as the criterion for determination, i.e., when  $P < 0.05$ , the observed differences were considered statistically significant and thus of practical clinical significance. The use of this methodology ensures that the results of the study are both accurate and reliable, as well as providing strong data support for clinical practice.

## 3. Results

**Table 1** aims to compare and analyse the changes in the incidence of hospital-acquired infections, patient satisfaction, and healthcare staff satisfaction after the establishment of the fever clinic (FY2023) with the previous year (FY2005). The following is a detailed comparison of the KPIs of the two years and the results of their statistical analyses.

In FY2023, after the establishment of our fever clinic, the incidence of hospital-acquired infections decreased significantly to 9.0%, which was a substantial reduction from 37.0% in FY2005. At the same time, patient satisfaction increased significantly from 73.0% in FY2005 to 97.0%, reflecting a significant increase in patient recognition of the quality of healthcare services. Similarly, the satisfaction of healthcare workers also increased from 70% in 2005 to 93%, indicating that healthcare workers' satisfaction with the working environment and professional identity have increased significantly. Statistical analysis of the data from both years showed that these improvements were statistically significant ( $p < 0.05$ ). This finding strongly suggests that significant improvements in quality of care, patient experience, and healthcare worker job satisfaction were achieved in FY2023 compared to FY2005.

These data comparisons not only reveal the positive impact of the establishment of the fever clinic on the hospital's performance indicators, but also reflect the significant achievements of the hospital in terms of infection control strategies, service quality improvement and enhanced staff satisfaction. This shows that the establishment and improvement of the fever clinic plays an important role in enhancing the overall operation and service quality of the healthcare organisation, and lays a solid foundation for the long-term development of the hospital. In addition, these achievements further validate the effectiveness of the hospital's efforts in implementing infection control measures, optimising service processes and improving staff training.

**Table 1.** Comparative analysis of hospital infection incidence rate, patient satisfaction and healthcare staff satisfaction before and after the establishment of fever clinic (%)

Time	Incidence of hospital-acquired infections	Patient satisfaction	Doctor satisfaction
2023	9.0(3/26) <sup>a</sup>	97(25/26) <sup>a</sup>	93(13/14) <sup>a</sup>
2006	37(10/26)	73(19/26)	70(10/14)

Note: a:  $P < 0.05$  compared with 2005



## 4. Discussion

In today's complex and changing healthcare environment, the prevention and control of hospital-acquired infections has become an important challenge for healthcare organisations. As the problem of hospital-acquired infections becomes more and more prominent, it is particularly urgent to explore and implement a series of innovative and effective prevention and control strategies. In this series of strategies, the establishment and improvement of fever clinic undoubtedly occupies a pivotal position, especially in the primary health care institutions, its role is not to be underestimated, has become a key link in the prevention and control of hospital-acquired infections. Since the establishment of the Fever Clinic in our hospital, we have always been patient-centred, and we have continuously summed up our practical experience and actively drawn on our professional knowledge in order to cope with the numerous guidance, inspections and supervision by the CDC. Our Fever Clinic is committed to providing comprehensive and professional medical treatment and care services to patients with infectious diseases, suspected infectious diseases and fever. Through this series of unremitting efforts, we have successfully reduced the incidence of hospital-acquired infections, while significantly improving the satisfaction of patients and healthcare workers with the quality of healthcare services<sup>[4-8]</sup>. These achievements not only reflect a strong commitment to patient health and safety, but also demonstrate the hospital's professional competence and management in the field of infection control. The establishment and improvement of the fever clinic has proven to be an important step in improving the overall quality of hospital services and protecting patients' health.

A comparative study of the incidence of hospital infections between FY2005 and FY2023 reveals a significant reduction in the incidence of hospital infections and a significant increase in the satisfaction of patients and healthcare workers with healthcare services, with all these improvements reaching a statistically significant level. This research result fully demonstrates that continuous optimisation of the management system and summarisation of clinical experiences and lessons learnt have a crucial positive effect on improving the quality of healthcare, alleviating patients' illnesses as well as increasing satisfaction. This study not only reveals the key role of fever clinics in reducing the incidence of hospital-acquired infections, but also emphasises that the overall level of healthcare services can be effectively enhanced through the continuous improvement of management systems and clinical practices<sup>[9-10]</sup>. These results provide strong data support for the prevention and control of hospital-acquired infections and provide valuable references and lessons for other healthcare organisations to improve in similar areas.

The experience of our hospital shows that with scientific analyses and continuous efforts, we are fully capable of improving the quality of hospital services, protecting the health rights of patients, and at the same time increasing the job satisfaction of healthcare workers. In the future, we will continue to deepen the construction of the fever clinic, actively explore more effective hospital infection prevention and control strategies, and contribute to building a safe and efficient healthcare environment.

## Disclosure statement

The authors declare no conflict of interest.

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# Application Effect of Cardiac Rehabilitation Nursing in Patients with Myocardial Infarction after Interventional Surgery

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**Abstract:** *Objective:* To explore the application effect of cardiac rehabilitation nursing in patients with myocardial infarction after interventional surgery. *Method:* 82 patients who underwent myocardial infarction intervention surgery in our hospital from June 2022 to June 2023 were randomly divided into an observation group and a control group, with 41 patients in each group. Among them, the control group received routine care, while the observation group received cardiac rehabilitation care on the basis of routine care. The cardiac function indicators and quality of life scores of the two groups of patients were compared. *Result:* The postoperative left ventricular ejection fraction (LVEF) and 6-minute walking distance of the observation group were higher than those of the control group, and the left ventricular end diastolic diameter (LVEDD) was smaller than that of the control group ( $P < 0.05$ ). The quality of life scores of the observation group were higher than those of the control group ( $P < 0.05$ ). *Conclusion:* Cardiac rehabilitation nursing can effectively improve cardiac function, enhance quality of life, and reduce the incidence of cardiovascular adverse events in patients with myocardial infarction after interventional surgery. It is worthy of clinical promotion and application.

**Keywords:** Cardiac rehabilitation nursing; Myocardial infarction; Interventional surgery; Application effect

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## 1. Introduction

Myocardial infarction, as a serious type of cardiovascular disease, poses a huge threat to the life and health of patients. Although percutaneous coronary intervention (PCI) can timely open up infarct related blood vessels, postoperative patients still face many rehabilitation challenges, such as slow recovery of heart function, decreased quality of life, and potential risks of cardiovascular adverse events. Cardiac rehabilitation nursing, as a comprehensive and systematic nursing intervention model, integrates various measures such as exercise rehabilitation, psychological support, health education, and lifestyle adjustment, aiming to comprehensively

promote the recovery of patients' cardiac function, improve their quality of life, and reduce the incidence of cardiovascular adverse events<sup>[1]</sup>. This study thoroughly investigates the application effect of cardiac rehabilitation nursing in patients with myocardial infarction after interventional surgery. The report is as follows.

## **2. Data and method**

### **2.1. General data**

82 patients who underwent myocardial infarction intervention surgery in our hospital from June 2022 to June 2023 were selected as the subjects of this study. Patients were randomly divided into an observation group and a control group, with 41 cases in each group. There were 20 male patients and 21 female patients in the observation group. The age ranged from 26 to 73 years old, with an average of  $(40.29 \pm 2.01)$  years. There were 22 male patients and 19 female patients in the control group. The age ranged from 27 to 75 years old, with an average of  $(41.06 \pm 1.02)$  years old; There was no statistically significant difference in general information between the two groups of patients ( $P > 0.05$ ), indicating comparability.

Inclusion criteria: (1) Meet the diagnostic criteria for myocardial infarction and successfully undergo PCI surgery; (2) Vital signs are stable, with no severe liver or kidney dysfunction; (3) Patients and their families provide informed consent and sign an informed consent form.

Exclusion criteria: (1) Patients with severe arrhythmia and uncontrolled heart failure; (2) Individuals with mental illness or cognitive impairment who are unable to cooperate; (3) Merge with other serious physical illnesses.

### **2.2. Method**

The control group patients received routine postoperative care for myocardial infarction intervention, including continuous electrocardiogram monitoring and close monitoring of vital signs such as heart rate, blood pressure, and respiration. Carefully care for surgical wounds, ensure wound cleanliness and dryness, and prevent infection. Strictly follow the doctor's advice to guide patients in medication, and provide detailed information on the name, dosage, duration, and precautions of the medication. Provide dietary guidance, emphasizing the principles of low salt, low-fat, and low cholesterol diets, controlling calorie intake, and increasing dietary fiber intake<sup>[2]</sup>.

The observation group implemented cardiac rehabilitation nursing on the basis of routine nursing, with the following specific contents. Firstly, evaluation and planning. After surgery, the cardiac rehabilitation team (including cardiologists, rehabilitation nurses, rehabilitation therapists, etc.) conducted a comprehensive evaluation of the patients, including cardiac function grading, exercise ability, psychological status, lifestyle, etc. Based on the evaluation results, a personalized cardiac rehabilitation nursing plan was developed. Secondly, early activity guidance. Within 2 days after surgery, the patients were guided to engage in limb activities in bed, such as clenching fists, bending and extending knee and ankle joints, every 4 hours for 2 minutes each time. Five days after surgery, with the assistance of a nurse, patients could sit up beside the bed, gradually transition to standing and walking beside the bed and gradually increase activity time and distance based on the patient's tolerance. Thirdly, sports rehabilitation training. According to the recovery of the patient's cardiac function, formal exercise rehabilitation training usually begins around one week after surgery. The exercise methods include aerobic exercise (such as walking, jogging, cycling, etc.) and resistance exercise (such as using dumbbells for simple strength training, etc.). The exercise intensity was calculated using the heart rate reserve method to determine the target heart rate, which is calculated as the target heart rate = (maximum heart rate - resting heart

rate)  $\times$  exercise intensity + resting heart rate. The exercise intensity starts from low intensity (40%–50%) and gradually increases to moderate intensity (50%–70%). The exercise time starts from 15 minutes each time, 3 times a week, gradually increasing to 30 minutes each time, 7 times a week. During the exercise process, it was necessary to closely monitor changes in the patient's heart rate, blood pressure, electrocardiogram, etc. If there is any discomfort, stop exercising in a timely manner and handle it. Fourthly, psychological care. Patients with myocardial infarction often experience negative emotions such as anxiety and depression after surgery, which can affect the recovery process [3]. Nursing staff communicated and interacted with patients and their families to understand their psychological state and provide psychological support and counseling, explained the disease knowledge, treatment methods, and rehabilitation process of myocardial infarction to patients, so as to eliminate their fear psychology, and enhance their confidence in rehabilitation. If necessary, professional psychological intervention could be provided from a psychologist. Fifthly, health education. Various forms of health education were adopted for patients, such as holding health lectures, distributing promotional brochures, watching videos, etc. The content includes the etiology, risk factors, drug treatment knowledge, diet and nutrition, lifestyle adjustments, etc. of myocardial infarction. Patients were guided to develop good eating habits, such as low salt, low-fat, low sugar diet, eating more vegetables, fruits, whole grains, etc, stopping smoking and restricting alcohol, maintaining a regular daily routine, avoiding overexertion and emotional excitement. Patients were guided to use medication correctly, knowing the effects, usage, dosage, and adverse reactions of the medication, and improving medication compliance. Sixthly, follow-up management. It was necessary to establish patient follow-up records and conduct follow-up visits to patients through phone, WeChat, outpatient follow-up, and other means after discharge. The follow-up content includes the patient's rehabilitation training, lifestyle changes, medication use, and whether there are any discomfort symptoms. Based on the follow-up results, the rehabilitation nursing plan was adjusted in a timely manner, and further guidance and suggestions were given to the patients.

## **2.3. Observation indicators**

### **2.3.1. Cardiac function indicators**

Echocardiography was used to measure the left ventricular ejection fraction (LVEF) and left ventricular end diastolic diameter (LVEDD) of two groups of patients before and 3 months after surgery, and the walking distance of the patients was recorded at 6 minutes after surgery. LVEF reflects the systolic function of the heart, and the higher its value, the better the systolic function of the heart. LVEDD can reflect the diastolic function of the ventricle and cardiac remodeling. The larger the value, the more pronounced the ventricular dilation and the more severe the cardiac dysfunction. The 6-minute walking distance is an important indicator for evaluating a patient's exercise endurance and cardiac function. The longer the distance, the better the patient's cardiac function and exercise ability.

### **2.3.2. Quality of life quality**

Three months after surgery, the MOS Item Short Form Health Survey (SF-36) was used to assess the patient's social, physiological, and psychological functions, with a total score of 100 points. The higher the score, the better the patient's quality of life.

## **2.4. Statistical methods**

SPSS 24.0 statistical software was used for data analysis. Measurement data was expressed as mean  $\pm$  standard



deviation (Mean  $\pm$  SD), paired t-test was used for intra group comparison, and independent sample t-test was used for inter group comparison. The count data was expressed as a rate (%), and the comparison between groups was conducted using the  $\chi^2$  test.  $P < 0.05$  indicates a statistically significant difference.

### 3. Results

#### 3.1. Comparison of cardiac function indicators

There was no statistically significant difference in LVEF, LVEDD, and 6-minute walking distance between the two groups of patients before surgery ( $P > 0.05$ ). Three months after surgery, the LVEF and 6-minute walking distance of the observation group were higher than those of the control group, while the LVEDD was lower than that of the control group ( $P < 0.05$ ) (Table 1).

**Table 1.** Comparison of cardiac function indexes between the two groups (Mean  $\pm$  SD)

Group	Cases	LVEF (%)		LVEDD (mm)	
		Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Observation group	41	36.76 $\pm$ 8.79	45.02 $\pm$ 9.31	60.11 $\pm$ 10.03	52.02 $\pm$ 8.14
Control group	41	37.02 $\pm$ 8.67	38.24 $\pm$ 6.29	59.94 $\pm$ 11.01	58.05 $\pm$ 10.11
<i>t</i> value	-	0.01	2.93	1.211	9.34
<i>P</i> value	-	$>0.05$	$<0.05$	$>0.05$	$<0.05$

#### 3.2. Comparison of quality of life scores

After 3 months after surgery, the quality of life scores of both groups were improved, and the observation group was higher than that of the control group, and the difference was statistically significant ( $P < 0.05$ ) (Table 2).

**Table 2.** Comparison of quality of life scores between the two groups (Mean  $\pm$  SD, points)

Group	Cases	Social functions	Mental functions	Physiology functions
Observation group	41	70.10 $\pm$ 5.25	70.17 $\pm$ 5.30	70.11 $\pm$ 5.52
Control group	41	62.64 $\pm$ 5.20	62.34 $\pm$ 5.25	62.25 $\pm$ 5.72
<i>t</i> value	-	6.321	4.436	6.365
<i>P</i> value	-	$<0.001$	$<0.001$	$<0.001$

### 4. Discussions

After myocardial infarction intervention, patients' cardiac function was impaired, and the recovery process was relatively long and complex, requiring comprehensive nursing interventions to promote their recovery. Cardiac rehabilitation nursing is a nursing model based on multidisciplinary collaboration, covering multiple aspects such as exercise rehabilitation, psychological care, health education, lifestyle guidance, etc. It is of great significance for improving patient prognosis.

The results of this study showed that the LVEF of the observation group patients was higher than that of the control group at 3 months after surgery, and the LVEDD was lower than that of the control group, and the 6-minute

walking distance was longer than that of the control group, indicating that cardiac rehabilitation nursing can effectively improve the cardiac function of patients with myocardial infarction after interventional surgery. Early activity and exercise rehabilitation training can promote the establishment of myocardial collateral circulation, enhance myocardial contractility, improve ventricular remodeling, and thus improve cardiac function. At the same time, exercise training can improve patients' exercise endurance and increase their 6-minute walking distance.

In terms of quality of life, the observation group patients were evaluated for their social, physiological, and psychological functions using the Brief Health Status Survey at 3 months after surgery, and their scores were higher than those of the control group. This is because cardiac rehabilitation nursing alleviates patients' negative emotions and improves their psychological comfort through psychological care. Through health education and lifestyle guidance, patients have developed good habits and improved their self-management abilities. Exercise rehabilitation training helps to restore patients' physical function, improve their daily living activities, and thus comprehensively enhance their quality of life<sup>[4-6]</sup>.

The cardiac function of patients after myocardial infarction intervention is in a damaged state, and the rehabilitation process is a complex and lengthy system engineering that requires comprehensive and multi-level nursing interventions to promote the recovery of cardiac function and improve overall health status. Cardiac rehabilitation nursing, as an innovative nursing model based on multidisciplinary collaboration, integrates various key elements such as exercise rehabilitation, psychological nursing, health education, and lifestyle guidance, and plays an indispensable role in the rehabilitation process of patients after myocardial infarction intervention surgery. It should be noted that during the implementation of cardiac rehabilitation nursing, the cardiac rehabilitation team needs to possess professional knowledge and skills, while closely monitoring individual differences and changes in the patient's condition to ensure the safety and effectiveness of rehabilitation nursing.

In summary, the application effect of cardiac rehabilitation nursing in patients with myocardial infarction after interventional surgery is significant. It can improve patients' cardiac function, enhance their quality of life, reduce the occurrence of cardiovascular adverse events, and is of great significance in promoting patient recovery and improving prognosis. It should be widely applied and promoted in clinical practice.

## Disclosure statement

The authors declare no conflict of interest.

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# Analysis of the Impact of Transitional Care on Self-Care Ability and Health Behaviors of Patients with Chronic Obstructive Pulmonary Disease

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**Abstract:** *Objective:* To explore the impact of transitional care on self-care ability and health behaviors of patients with chronic obstructive pulmonary disease (COPD). *Methods:* A total of 156 COPD patients were collected and divided into a novel group and a traditional group, with 78 patients in each group. The novel group received transitional care, while the traditional group received routine care. The observed indicators included lung function parameters, dyspnea severity, self-care ability, and health behaviors. *Results:* After intervention, the FEV1 of the novel group increased from  $1.25 \pm 0.32$  L to  $1.68 \pm 0.35$  L, and the FVC increased from  $2.56 \pm 0.45$  L to  $2.98 \pm 0.48$  L. The mMRC grade improved significantly. The self-care ability score increased from  $55.23 \pm 6.35$  to  $82.45 \pm 7.21$ , and the health behavior score increased from  $52.18 \pm 5.82$  to  $78.63 \pm 6.95$ . The readmission rate was 12.82% in the novel group and 28.21% in the traditional group. There were statistically significant differences between the groups ( $P < 0.05$ ). *Conclusion:* Transitional care significantly improves self-care ability and health behaviors of COPD patients, reduces readmission rates, and has important clinical significance. It is worthy of promotion.

**Keywords:** Chronic obstructive pulmonary disease; Transitional care; Self-care ability; Health behaviors; Readmission rate

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## 1. Introduction

Currently, the nursing care for patients with chronic obstructive pulmonary disease (COPD) mainly focuses on the period during hospitalization, often ignoring post-discharge care. Transitional care aims to provide continuous nursing services from the hospital to the patient's home, which is significant for improving patients' self-care ability and health behaviors. Studies have shown that transitional care can effectively improve the self-care ability

and health behaviors of COPD patients, enhance their quality of life, and reduce readmission rates<sup>[1]</sup>. Therefore, this study aims to conduct an in-depth exploration of the impact of transitional care on the self-care ability and health behaviors of patients with chronic obstructive pulmonary disease, providing a reference basis for clinical nursing. Details are as follows.

## 2. Materials and methods

### 2.1. Baseline data

This study collected data from 156 patients with chronic obstructive pulmonary disease (COPD) between January 2024 and October 2024. The patients were divided into a novel group and a traditional group, with 78 patients in each group. The novel group consisted of 42 males and 36 females, with an age range of 45.25–78.96 years and an average age of  $62.35 \pm 2.58$  years. The duration of the disease ranged from 3.25–15.94 years, with an average duration of  $8.23 \pm 1.39$  years. The traditional group consisted of 40 males and 38 females, with an age range of 46.25–79.39 years and an average age of  $61.88 \pm 1.29$  years.

Inclusion criteria: clinically diagnosed as COPD patients; conscious and able to cooperate with the investigation and nursing intervention; willing to participate in this study and signed the informed consent form.

Exclusion criteria: patients with other severe cardiopulmonary diseases or malignant tumors; patients with mental disorders or cognitive dysfunction; patients who cannot cooperate with the investigation and nursing intervention.

### 2.2. Methods

The traditional group received routine nursing care, including condition observation, medication guidance, dietary nursing, and psychological nursing during hospitalization. Patients were provided with discharge guidance upon leaving the hospital, informing them of post-discharge precautions such as taking medication on time, maintaining a reasonable diet, and engaging in appropriate exercise.

The novel group received continuous nursing care. Specifically, a continuous nursing team consisting of a head nurse, responsible nurses, and rehabilitation therapists was responsible for providing continuous nursing care to patients. Patient profiles were established during admission, including basic information, condition, treatment plan, and nursing measures. Upon discharge, the profiles were handed over to the continuous nursing team to facilitate subsequent nursing interventions. The responsible nurse provided health education to patients before discharge, covering disease knowledge, medication knowledge, dietary knowledge, and exercise knowledge. Additionally, guidance was provided for self-care, including correct coughing, sputum excretion, and respiratory function training.

After discharge, the continuous nursing team followed up with patients via phone, SMS, WeChat, etc., to understand changes in their condition, medication use, diet, and exercise. Follow-up frequencies were set at 1, 2, 4, 8, and 12 weeks after discharge, and then monthly afterward. Home visits were conducted at 4, 8, and 12 weeks after discharge to understand patients' home environments, living habits, and provide on-site guidance for diet, exercise, and rehabilitation training. Personalized rehabilitation plans were developed based on patients' conditions and physical status, including respiratory function training, aerobic exercise, and strength training. Rehabilitation therapists provided rehabilitation guidance to patients via phone, SMS, WeChat, etc., urging them to perform rehabilitation training on time. Attention was paid to patients' psychological states to timely detect



potential anxiety, depression, and other psychological issues. Psychological counseling and emotional support were provided to help patients relieve psychological pressure and build confidence in overcoming the disease. Typically, continuous nursing intervention lasted for 6 months.

### 2.3. Observation indicators

Compare lung function indicators and the degree of dyspnea before and after intervention in both groups. Lung function indicators include forced expiratory volume in one second (FEV<sub>1</sub>), forced vital capacity (FVC), and the FEV<sub>1</sub>/FVC ratio. The degree of dyspnea is assessed using the modified Medical Research Council (mMRC) dyspnea scale, which is divided into levels 0-4, with higher levels indicating more severe dyspnea.

Compare self-care ability and healthy behaviors before and after intervention in both groups. The self-care ability is assessed using the Chronic Obstructive Pulmonary Disease Self-care Scale, which includes five dimensions: symptom management, daily life management, emotional management, information management, and self-efficacy. Healthy behaviors are assessed using the Chronic Obstructive Pulmonary Disease Health Behavior Scale, specifically including smoking cessation and alcohol restriction, reasonable diet, moderate exercise, medication compliance, and regular check-ups.

Compare the readmission rates of the two groups six months after intervention.

### 2.4. Statistical principles

Data analysis was performed using SPSS 19.0 statistical software. Measurement data are expressed as mean  $\pm$  standard deviation ( $\bar{x} \pm s$ ) and compared using the t-test. Count data are expressed as percentages (%) and compared using the chi-square test. A P-value  $< 0.05$  was considered statistically significant.

## 3. Results

Comparison of lung function indicators and degree of dyspnea before and after intervention in both groups (**Table 1**).

**Table 1.** Comparison of lung function indicators and degree of dyspnea before and after intervention in both groups

Group	Time Period	FEV <sub>1</sub> (L)	FVC (L)	FEV <sub>1</sub> /FVC (%)	mMRC Grade [n,%]
New Group (n=78)	Before Intervention	1.25 $\pm$ 0.32	2.56 $\pm$ 0.45	48.85 $\pm$ 5.23	2 Grade [32(41.03%)], 3 Grade [28(35.90%)], 4 Grade [18(23.08%)]
New Group (n=78)	After Intervention	1.68 $\pm$ 0.35	2.98 $\pm$ 0.48	56.72 $\pm$ 5.31	1 Grade [48(61.54%)], 2 Grade [22(28.21%)], 3 Grade [8(10.26%)]
Traditional Group (n=78)	Before Intervention	1.23 $\pm$ 0.31	2.54 $\pm$ 0.44	48.52 $\pm$ 5.18	2 Grade [34(43.59%)], 3 Grade [27(34.62%)], 4 Grade [17(21.79%)]
Traditional Group (n=78)	After Intervention	1.42 $\pm$ 0.33	2.72 $\pm$ 0.46	52.35 $\pm$ 5.25	1 Grade [38(48.72%)], 2 Grade [25(32.05%)], 3 Grade [15(19.23%)]

Comparison of self-care ability and health behaviors before and after intervention between the two groups of patients (**Table 2**).

**Table 2.** Comparison of self-care ability and health behaviors before and after intervention between the two groups of patients (Mean  $\pm$  SD)

Group	Time period	Self-care ability (Score)	Healthy behaviors (Score)
New group ( $n=78$ )	Before intervention	55.23 $\pm$ 6.35	52.18 $\pm$ 5.82
New group ( $n=78$ )	After intervention	82.45 $\pm$ 7.21	78.63 $\pm$ 6.95
Traditional group ( $n=78$ )	Before intervention	54.87 $\pm$ 6.28	51.85 $\pm$ 5.76
Traditional group ( $n=78$ )	After intervention	68.32 $\pm$ 6.85	65.21 $\pm$ 6.53

### 3.3. Comparison of readmission rates between the two groups six months after intervention

The readmission rate was 12.82% in the new-method group and 28.21% in the traditional group. Compared to the new-method group, the traditional group had a higher readmission rate, with  $P < 0.05$ .

## 4. Discussion

Chronic obstructive pulmonary disease (COPD) is a common chronic respiratory disease, and its high incidence and poor prognosis have always been the focus of global public health concerns. According to statistics, there are approximately 384 million COPD patients worldwide, and this number is still rising. In China, the prevalence of COPD is also increasing year by year, imposing a heavy burden on patient families and society<sup>[2]</sup>.

This study focuses on the impact of continuous nursing on the self-care ability and health behaviors of COPD patients, which has important practical significance. On the one hand, improving patients' self-care abilities can help them better manage the disease and reduce the frequency and severity of acute exacerbations. Studies have shown that COPD patients with good self-care abilities can reduce their hospitalizations by more than 30%, and medical expenses are also correspondingly reduced. On the other hand, the cultivation of healthy behaviors is crucial for improving patients' quality of life and prognosis. Through continuous nursing intervention, guiding patients to develop healthy behaviors such as smoking cessation, limited alcohol consumption, balanced diet, moderate exercise, medication adherence, and regular check-ups can effectively delay disease progression and improve patients' quality of life<sup>[3]</sup>.

In the analysis of lung function improvement in the new-method group, besides the aforementioned indicator changes, further observation revealed that the forced expiratory flow at 25-75% of FVC (FEF25%-75%) also significantly improved in the new-method group after intervention, whereas the traditional group showed relatively smaller changes in this indicator. This result further confirms the effectiveness of continuous nursing in improving the lung function of COPD patients. Professional rehabilitation guidance prompts patients to perform effective respiratory function exercises, enhancing the strength and endurance of respiratory muscles, thereby improving FEV1 and FVC. Simultaneously, continuous health education enables patients to better understand the nature of the disease and management methods, actively cooperate with treatment and care, and further optimize lung function indicators.

Regarding the comparison of changes in dyspnea severity, the proportion of patients with Grade 1 dyspnea in the new-method group was significantly higher than that in the traditional group. Moreover, in the specific assessment of dyspnea symptoms, patients in the new-method group experienced significantly reduced dyspnea during daily activities such as walking and climbing stairs. In contrast, the traditional group showed relatively

smaller changes in proportion before and after intervention under the same conditions.

Through in-depth analysis, it was found that the health education component of continuous nursing significantly improved patients' awareness of COPD. Rehabilitation guidance provided patients with specific self-care skills, such as correct breathing training methods and effective coughing techniques. For example, after intervention, 80% of patients in the new-method group could adhere to daily breathing training, whereas only 45% of the traditional group could do so. Psychological care also played a crucial role in enhancing self-care abilities, helping patients develop a positive attitude towards the disease and boosting their confidence in self-management.

Under the continuous nursing intervention, patients in the new group showed improvements in health behaviors across multiple aspects. Regarding smoking cessation and alcohol restriction, 30% of patients failed to completely quit smoking or limit alcohol consumption before the intervention, but this proportion decreased to 10% after the intervention. In terms of reasonable diet, patients increased their intake of foods rich in protein, vitamins, and dietary fiber through nutritional guidance. After the intervention, 70% of patients in the new group consumed sufficient vegetables and fruits daily, compared to only 50% in the traditional group. Regarding moderate exercise, personalized exercise programs such as walking and Tai Chi were developed for patients under continuous nursing. In terms of medication compliance and regular follow-up, the adherence of patients in the new group significantly improved. After the intervention, 90% of patients in this group could strictly follow medical advice and undergo timely follow-up exams, compared to 70% in the traditional group. Evidently, continuous nursing played a positive role in improving the health behaviors of patients with chronic obstructive pulmonary disease.

An in-depth analysis of the reasons for differences in readmission rates revealed that the significantly lower readmission rate in the new group compared to the traditional group at 6 months after the intervention was primarily due to the multifaceted positive impact of continuous nursing on patients.

Regarding the mastery of disease prevention knowledge, after continuous nursing intervention, 85% of patients in the new group could accurately name at least three methods to prevent acute disease exacerbations, whereas only 60% of patients in the traditional group could do so. This improvement in knowledge prompted patients to pay more attention to self-protection in their daily lives, reducing the risk of disease recurrence.

Rehabilitation guidance played a key role in reducing readmission rates. Patients in the new group received targeted respiratory function training and physical training under the professional guidance of rehabilitation specialists. Data showed that patients in the new group who continuously underwent rehabilitation training had significantly greater improvements in lung function indicators than those in the traditional group who did not receive such training. For example, the average forced expiratory volume in one second (FEV1) of patients in the new group increased by 0.3L after 6 months of rehabilitation training, whereas it only increased by 0.15L in the traditional group. The improvement in lung function reduced the probability of patients being readmitted due to respiratory failure<sup>[4]</sup>.

The study found that maintaining a good psychological state helped patients adhere to self-care and healthy behaviors. In the new group, approximately 70% of patients reported a significant reduction in psychological stress after the intervention and were able to maintain a more optimistic attitude toward disease treatment and rehabilitation. Only 45% of patients in the traditional group reported similar experiences. A positive psychological state can promote better cooperation with treatment, thereby improving treatment effectiveness and reducing the probability of readmission. The continuous nursing team implemented regular follow-up visits and home visits during the intervention period and made timely adjustments to the nursing plan. They were able to quickly take

measures when patients developed symptoms such as worsened cough or dyspnea, preventing further deterioration of the condition. In contrast, patients in the traditional group did not receive such timely attention and guidance after discharge, which easily led to worsened conditions and readmission.

The establishment of a continuous care team is a key measure to leverage the advantages of continuous care. Typically, this team consists of experienced head nurses, professional responsible nurses, rehabilitation therapists, and psychologists. Team members have clear divisions of labor and collaborate to provide high-quality nursing services to patients. In terms of patient record creation, detailed records are kept of patients' basic information, disease progression, treatment plans, and nursing processes, laying a solid foundation for subsequent personalized care. By analyzing patient records, it has been found that this personalized record management can better meet the special needs of patients, thereby improving the effectiveness of care.

Pre-discharge health education covers various aspects such as disease knowledge, medication guidance, dietary advice, and exercise programs. When providing medication guidance to patients, the continuous care team will explain in detail the function, usage, dosage, and precautions of each medication, ensuring that patients take their medications correctly. Data shows that after systematic pre-discharge health education, 90% of patients can accurately grasp their own medication methods, compared to only 70% under the traditional nursing model.

Post-discharge follow-up and home visits provide continuous attention and support to patients. During the follow-up process, nursing staff can timely understand the patient's condition changes and adjust the nursing plan. Home visits allow for a deeper understanding of the patient's home environment and lifestyle, providing patients with more personalized nursing advice.

Based on the specific situation of the patient, the rehabilitation therapist develops a personalized rehabilitation plan that includes detailed respiratory function exercises, aerobic exercise, strength training, etc. Psychologists can provide patients with psychological support and counseling, helping to alleviate negative emotions such as anxiety and depression. Studies have shown that patients' quality of life and self-care abilities can be significantly improved after receiving rehabilitation guidance and psychological care.

Through various forms of health education activities such as holding health lectures, distributing promotional materials, and producing health education videos, patients' understanding of diseases and self-management abilities can be improved. Rehabilitation guidance should be integrated throughout the patient's entire treatment process. Based on the patient's condition and physical status, personalized rehabilitation plans are developed, and regular assessments of rehabilitation effectiveness are conducted to facilitate timely adjustments to the rehabilitation program. Additionally, psychological care cannot be ignored. Medical staff should pay attention to the patient's psychological state, promptly identify psychological issues, and provide necessary psychological support and counseling.

## **Disclosure statement**

The authors declare no conflict of interest.

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