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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±0.01)%, Exertion respiratory volume at 1st second (1.45±0.04)L, (2.54±0.31) L, and partial pressure of oxygen (94.03±5.17)mmHg were higher than those of the control group (0.41±0.02)%, (90.12±5.28)L, (2.29±0.28)L, and (94.03±5.17)mmHg, and partial pressure of carbon dioxide of the observation group patients (36.55±3.15)mmHg was lower than that of the control group (41.47±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 [1–2]. 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 [3]. Due to the lack of comprehensive targeted care for patients in traditional nursing interventions, the effect of nursing interventions is very limited [4]. 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 ± 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±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 $x2$ test; the measuring data were expressed in terms of (Mean ± 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 ± 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±0.02	1.18±0.05	2.29±0.28	90.12±5.28	41.47±3.23
Observation group (*n*=40)	0.57±0.01	1.45±0.04	2.54±0.31	94.03±5.17	36.55±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)* (T**a**ble 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)
x^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 ± 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±2.09	81.16±2.13	82.44±2.03	81.62±1.73	82.85±2.14	83.45±2.07	83.41±2.16	83.17±2.22
Observation group (*n*=40)	85.52±2.04	87.33±2.12	86.01±1.83	86.69±1.87	87.72±2.08	86.02±2.10	86.48±2.19	85.89±2.27
t	8.5105	12.9849	8.2612	12.5870	10.3209	5.5123	6.3122	5.4180
P	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 [9].

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 [10–11]. 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 [12]. 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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