

Original Article

Effects of comprehensive nursing on improving medical care and quality of life in patients with chronic heart failure

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Abstract: Objective: This study aimed to explore the effects of comprehensive nursing in patients with chronic heart failure (CHF). Methods: Ninety-eight patients with CHF admitted to the hospital from Mar 2016 to Jan 2018 were randomly divided into the intervention group (n = 49) and the control group (n = 49). Patients in the control group received routine nursing, whereas the intervention group received comprehensive nursing in addition to routine nursing. The following parameters are measured before nursing and one day before discharge, including the left ventricular ejection fraction (LVEF) and left ventricular end-systolic dimension (LVDs). Anxiety and depression were evaluated with self-rating anxiety scale (SAS) and self-rating depression scale (SDS) respectively. Quality of life questionnaire (QLQ) is designed to measure indicators three months after discharge, including general health (GH), role physical (RP), physical functioning (PF), social functioning (SF), role emotional (RE) and mental health (MH). Nursing efficiency and satisfaction were also observed. Results: The intervention group and the control group showed significantly increased LVEF and decreased LVDs ($P < 0.001$) after nursing. After nursing, the intervention group exhibited significantly higher LVEF, lower LVDs and SAS as well as SDS scores than those in the control group ($P < 0.001$). The nursing efficiency in the intervention group was significantly higher than that in the control group ($P = 0.021$). Moreover, nursing satisfaction in the intervention group was significantly higher than that in the control group ($P = 0.002$). Conclusion: Comprehensive nursing can promote the recovery of patients with CHF through reducing negative emotions and improving quality of life and nursing satisfaction for patients.

Keywords: Chronic heart failure, comprehensive nursing, quality of life, bad emotions

Introduction

Chronic heart failure (CHF) is a complex clinical syndrome that results from several disorders [1]. Patients with CHF should be provided with routine therapy, especially effective and scientific nursing interventions. Nursing intervention plays an important role in slowing the course of disease for patients with CHF [2, 3].

For routine nursing, nursing care was provided with clinical experience, and nurses usually did not focus on individual conditions of patients [4]. Therefore, the clinical effect of routine nursing is not ideal and routine nursing is unable to meet the needs of most patients [5]. Comprehensive

nursing focuses on the nursing management process and serves the patients systematically. Responsibility and duty of nursing teams and standardized nursing plans are clearly defined [6]. Comprehensive nursing intervention is a nursing procedure that adjusts to the course of disease and response of patients [7]. There have been some studies on the clinical application of comprehensive nursing. A study by Li et al. [8] has shown that comprehensive nursing can prevent catheter-related urinary tract infections in patients with urinary surgery. Nayak et al. [9] found that comprehensive nursing intervention can improve anxiety, fatigue, self-efficacy and quality of life of patients with coronary heart disease.

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Currently, there are few studies on the application of comprehensive nursing in patients with CHF. This study aimed to explore comprehensive nursing on patients with CHF, so as to provide a feasible nursing intervention for patients with CHF.

Materials and methods

General data

This study was approved by the medical ethics committee of the First Hospital of Lanzhou University. Ninety-eight patients with CHF admitted from Mar 2016 to Jan 2018 were randomized into an intervention group (N = 49) and the control group (N = 49). Patients in the control group received routine nursing, while comprehensive nursing intervention was additionally provided in the intervention group. The intervention group had, 31 males and 18 females, aged 44 to 76, with an average age of (59.24 ± 5.19) years old and an average course of disease of (6.37 ± 1.16) years. In the control group, there were 27 males and 22 females, aged 43 to 73 years, with an average age of (57.79 ± 5.62) years old and an average course of disease of (6.19 ± 0.97) years.

Inclusion and exclusion criteria

Inclusion criteria were as follows: patients were diagnosed with CHF and met the diagnostic criteria of the European Society of Cardiology (ESC) guidelines [10], and were classified as II-IV according to Cardiac functional grading of New York Heart Association (NYHA) [11]. Patients received anti-heart failure treatment within 3 months prior to admission with stable hemodynamics. Patients experienced clinical symptoms such as shortness of breath, paroxysmal dyspnea, and expectoration. Patients and their family members signed the informed consent.

Exclusion criteria were as follows: patients with myocardial infarction within the past two months, acute chronic obstructive pulmonary disease, congenital heart disease (CHD), fatal arrhythmia, cardiogenic shock (CGS), retinopathy, severe liver and kidney dysfunction, connective tissue disease, metabolic endocrine disease, neurological disorders, hematopoietic dysfunction, immune disease, malignant tu-

mors, chemotherapy, trauma, and family history of mental illness were all excluded.

Nursing methods

The control group received routine nursing, including control of exercise during hospital stay, cardiac load alleviation, body functional support five times each day, body cleaning to avoid bedsores. Oxygen inhalation: patients received oxygen inhalation to reduce cardiac load, and cyanosis of lips was observed to control oxygen flow. Dietary nursing: patients received light and easily digestive foods, such as food with low calorie, low fat, low salt, high vitamins, rich in magnesium and potassium, and avoided stimulating food. Smaller portions with less food but more meals, potassium-rich food according to blood potassium levels of patients. Medication nursing: changes in heart rhythm, urine volume and electrolytes were monitored during treatment, digitalis drugs were used according to the time and symptoms observed.

The intervention group received comprehensive nursing intervention based on routine nursing, including predictive nursing: for the prevention of acute exacerbation in patients with CHF, such as acute myocardial ischemia (AMI), respiratory tract infection (RTI), monitoring of the cardiovascular system and the respiratory tract to avoid iatrogenic cardiac insufficiency. Defecation nursing: patients with CHF were prone to movement restrictions and gastrointestinal congestion, or even acute exacerbation of heart failure. Patients are advised to drink more water and eat more vegetables and fruit, along with foods that are high in fiber to promote peristalsis and regular defecation in patients; laxatives should be given if necessary. Psychological nursing: psychological state of patients should be assessed, especially main factors causing psychological changes. Active communication is needed to win the trust from patients and support from their family members to eliminate psychological barriers of patients, so as to establish a good nurse-patient relationship and the confidence of receiving treatment. Rehabilitation nursing: nursing measures are adopted according to the recovery and body limits of patients. For example, aerobic exercise is good to alleviate myasthenia and heart failure. Rehabilitation training is carried out through exercising for 30 minutes

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each day at the initial stage and adjusted according to the body limits of patients. Medication nursing: patients were informed of taking medicine and the necessity of drug therapy. The drugs for patients with CHF are vasodilators and cardiac stimulants. Patients were informed of the usage of various drugs and followed the instructions of doctors, and any precautions during medication, so as to improve the awareness of drug safety. Discharge instruction: patients formed good lifestyle and living habits with guidance, such as nutrition intake, prohibition of stimulating food, balance between work and rest and helpfulness of a good mood, along with no smoking and no alcohol. Based on the recovery of patients, exercise is encouraged to enhance the immunity to disease along with further consultation being provided to patients.

Both groups were nursed at the time of admission, and patients received nursing for one month during hospitalization. Telephone follow-up was performed every month after discharge for three consecutive months.

Outcome measures

Changes of cardiac function indexes including left ventricular ejection fraction (LVEF) and left ventricular end-systolic dimension (LVDs) were observed at admission and 2 months after the start of nursing in the two groups.

Anxiety and depression were evaluated before and after nursing and one month after the beginning of nursing. Self-rating anxiety scale (SAS) [12] was used to evaluate the conditions of patients, with 100 points in total. Fifty to 70 points indicates mild anxiety; 71 to 90 points, moderate anxiety; 90 scores or above indicate severe anxiety. Higher scores indicated more serious conditions. Self-rating depression scale (SDS) [13] was used to evaluate the conditions of patients, with 100 points in total. Fifty to 70 points indicates mild anxiety; 71 to 90 points, moderate anxiety; 90 scores or above, severe anxiety.

The nursing effect of the two groups was observed before discharge. The evaluation criteria were as follows: clinical symptoms of patients were improved or disappeared after nursing intervention, indicating a significant effect. After nursing intervention, clinical symptoms of patients were improved and the cardiac func-

tion grading was evaluated as grade I, indicating effective. Clinical symptoms of patients were not improved or aggravated, indicating invalid. [(significant effect + effective)/total number of cases × 100% = effective rate].

Quality of life questionnaire (QLQ) [14] was used to evaluate the quality of life of patients 3 months after discharge, including: general health (GH), role physical (RP), physical functioning (PF), social functioning (SF), role emotional (RE) and mental health (MH). One day before discharge, a self-made nursing satisfaction questionnaire was filled out by every patient, with 100 points in total. Eighty-five points or above indicates very satisfied, 60 to 85 points indicates satisfaction, and 60 points or below indicates not satisfied. [(very satisfied + satisfaction)/total number of cases × 100% = nursing satisfaction].

Statistical methods

SPSS 20.0 (IBM Corp, Armonk, NY, USA) was used for statistical analysis. The data were plotted by using GraphPad Prism 7. The count data were expressed by [n (%)] and was compared using chi-square test between groups. Measurement data were expressed as mean ± standard deviation ($\bar{x} \pm sd$) and were compared using the t test among groups. Paired t test was used for intragroup before-after comparison. $P < 0.05$ indicates a statistically significant difference.

Results

General information

There was no significant difference in gender, age, course of disease, body mass index (BMI), history of diabetes, coronary heart disease and hypertension, dilated cardiomyopathy, ischemic cardiomyopathy, history of smoking, drinking history, cardiac function grading, residence, education background and blood glucose (Glu) ($P > 0.05$) between intervention group and the control group to begin with (**Table 1**).

Cardiac function before and after nursing in the two groups

There was no significant difference in LVEF and LVDs between the intervention group and the control group before nursing ($P > 0.05$).

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Table 1. General information [n (%)] ($\bar{x} \pm SD$)

Category	Intervention group (n = 49)	Control group (n = 49)	t/ χ^2 value	P value
Gender			0.676	0.411
Male	31 (63.27)	27 (55.10)		
Female	18 (36.73)	22 (44.90)		
Age	59.24 \pm 5.19	57.79 \pm 5.62	1.327	0.188
Course of disease (year)	6.37 \pm 1.16	6.19 \pm 0.97	0.833	0.407
BMI (kg/m ²)	23.05 \pm 2.57	23.62 \pm 2.38	1.139	0.258
Combined with diabetes			0.200	0.655
Yes	15 (30.61)	13 (26.53)		
No	34 (69.39)	36 (73.47)		
Coronary heart disease			0.383	0.536
Yes	21 (42.86)	18 (36.73)		
No	28 (57.14)	31 (63.27)		
Combined with hypertension			0.042	0.836
Yes	20 (40.82)	19 (38.78)		
No	29 (59.18)	30 (61.22)		
Dilated cardiomyopathy			0.333	0.564
Yes	6 (12.24)	8 (16.33)		
No	43 (87.76)	41 (83.67)		
Ischemic cardiomyopathy			0.373	0.541
Yes	23 (46.94)	20 (40.82)		
No	26 (53.06)	29 (59.18)		
History of smoking			1.470	0.225
Yes	27 (55.10)	21 (42.86)		
No	22 (44.90)	28 (57.14)		
Drinking history			0.046	0.831
Yes	16 (32.65)	17 (34.69)		
No	33 (67.35)	32 (65.31)		
Heart function classification			0.021	0.885
II	16 (32.65)	14 (28.57)		
III	22 (44.90)	27 (55.10)		
IV	11 (22.45)	8 (16.33)		
Place of residence			0.883	0.347
City	35 (71.43)	39 (79.59)		
Rural	14 (28.57)	10 (20.41)		
Educational level			1.971	0.160
Primary school	2 (4.08)	4 (8.16)		
Middle school	5 (10.20)	5 (10.20)		
High school	16 (32.65)	22 (44.90)		
University	26 (53.06)	18 (36.73)		
Glu (mmol/L)	6.11 \pm 0.73	6.09 \pm 0.81	0.128	0.898

than that in the control group ($P < 0.001$) (Table 2 and Figure 1).

Anxiety and depression before and after nursing in two groups

There was no significant difference in SAS and SDS scores between intervention group and the control group before nursing ($P > 0.05$). Scores of SAS and SDS in the intervention group and the control group were significantly lower than before nursing ($P < 0.001$). Scores of SAS and SDS in the intervention group were significantly lower than those in the control group ($P < 0.001$) after nursing (Table 3 and Figure 2).

Nursing effect in the two groups

There were 18 cases with significant effect (36.73%), 28 effective cases (57.14%) and 3 invalid cases (6.12%), with an effective rate accounting for 93.88% in the intervention group after nursing. In the control group, 11 cases had significant effect (22.45%), 27 cases were effective (55.10%) and 11 cases were invalid (22.45%), with an effective rate accounting for 77.55%. The nursing efficiency of the intervention group was significantly higher than that of the control group ($P = 0.021$) (Table 4).

LVEF in the intervention group and the control group significantly increased ($P < 0.001$) while LVDs significantly decreased ($P < 0.001$) after nursing. LVEF in the intervention group was significantly higher than that in the control group ($P < 0.001$), while LVDs were significantly lower

Quality of life score after nursing in the two groups

GH score, RP score, PF score, SF score, RE score and MH score of QLQ items in the intervention group were significantly higher than

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Table 2. Comparison of cardiac function between the two groups before and after nursing intervention ($\bar{x} \pm SD$)

Group	n	LVEF (%)		t	P	LVDs (mm)		t	P
		Before treatment	After nursing			Before treatment	After nursing		
Intervention group	49	42.57 ± 2.45	53.75 ± 3.62	17.900	< 0.001	50.51 ± 3.24	41.27 ± 3.06	14.510	< 0.001
Control group	49	42.51 ± 2.43	48.91 ± 3.59	10.330	< 0.001	50.46 ± 3.67	45.81 ± 3.35	6.551	< 0.001
t	-	0.122	6.645	-	-	0.071	7.004	-	-
p	-	0.903	< 0.001	-	-	0.943	< 0.001	-	-

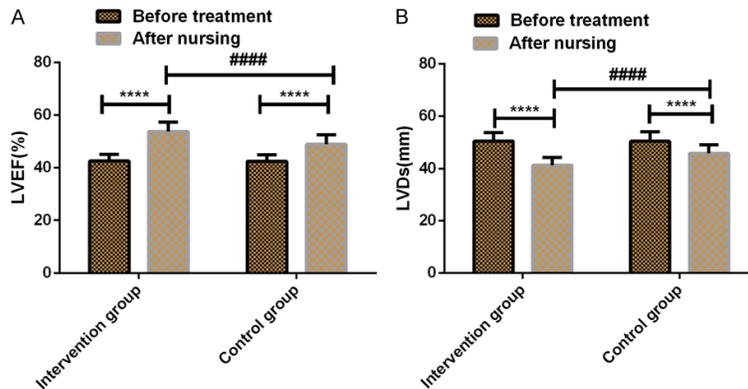


Figure 1. Comparison of cardiac function before and after nursing between the two groups. The results of LVEF were compared before and after nursing in the two groups (A); the results of LVDs were compared before and after nursing in the two groups (B). Note: **** indicates $P < 0.001$ compared with before nursing, #### indicates $P < 0.001$ compared with the control group after treatment.

those in the control group ($P < 0.001$) (Table 5 and Figure 3).

Nursing satisfaction after nursing in the two groups

In the intervention group, 19 cases (38.78%) were very satisfied with the nursing, 27 cases (55.10%) had satisfaction, 3 cases (6.12%) were not satisfied, with the nursing satisfaction accounting for 93.88%. In the control group, 14 cases (28.57%) were very satisfied, 20 cases (40.82%) had satisfaction, 15 cases (30.61%) were not satisfied, and the nursing satisfaction accounted for 69.39%. The nursing satisfaction of the intervention group was significantly higher than that of the control group ($P = 0.002$) (Table 6).

Discussion

Patients with CHF suffered from continuous and long-term heart failure, of which the number of cases presenting is a growing trend in

recent years, especially in the elderly [15]. Patients with CHF are likely to suffer from pathological deterioration of cardiac pump function, neuroendocrine changes and inflammatory immune system changes, which not only affects the daily lives of patients, but also poses a serious threat to the health of patients [16]. Patients with CHF need to be treated, especially with targeted nursing intervention in the course of treatment, which can promote the recovery of patients [17-19].

Comprehensive nursing, originally proposed in the United States, aims to carry out nursing management modalities systematically, by clarifying responsibility and duty of nursing teams and standardizing nursing plans, education plans and discharge plans. Comprehensive nursing plans can be adjusted based on the conditions of patients to ensure the quality of service [20, 21]. Previous studies have investigated the application of comprehensive nursing clinically. For example, Ko et al. [22] revealed that comprehensive nursing for patients with chronic obstructive pulmonary disease (COPD) could reduce the readmission rate (READM), hospital stay and improve the quality of life. Shyu et al. [23] demonstrated that comprehensive nursing could improve the condition of elderly patients with hip fracture and reduce the risk of depression and falls. Therefore, comprehensive nursing brings benefits for rehabilitation of patients.

Due to the influence of CHF, the cardiac function of patients continues to deteriorate, cardiac output decreases, the condition is prolonged, and then patients often need to be hospital-

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Table 3. Comparison of SAS and SDS scores before and after nursing intervention in the two groups ($\bar{x} \pm SD$)

Group	n	SAS score		t	P	SDS score		t	P
		Before treatment	After nursing			Before treatment	After nursing		
Intervention group	49	89.41 ± 4.11	64.83 ± 3.67	31.230	< 0.001	87.64 ± 3.28	62.17 ± 3.09	39.560	< 0.001
Control group	49	88.73 ± 3.95	75.92 ± 3.49	17.010	< 0.001	86.89 ± 3.51	74.18 ± 3.24	18.630	< 0.001
t	-	0.835	15.330	-	-	1.093	18.780	-	-
p	-	0.406	< 0.001	-	-	0.277	< 0.001	-	-

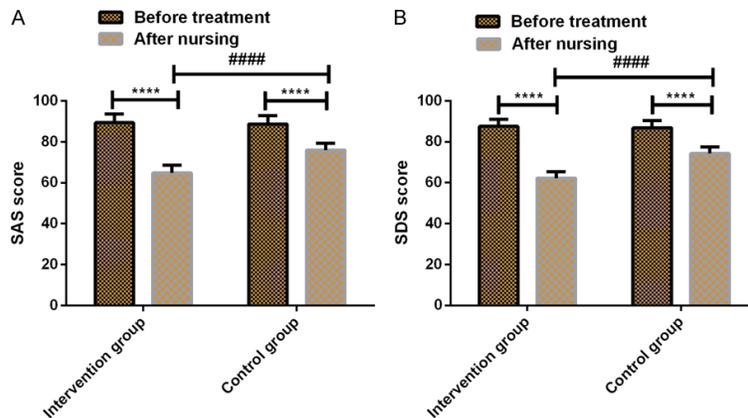


Figure 2. Comparison of SAS and SDS scores before and after nursing between the two groups. SAS scores before and after nursing intervention were compared between the two groups (A); SDS scores before and after nursing intervention were compared between the two groups (B). Note: **** indicates $P < 0.001$ compared with before nursing, #### indicates $P < 0.001$ compared with the control group after nursing.

Table 4. Comparison of the results of two groups of nursing results [n (%)]

Group	n	Significant effect	Effective	Invalid	Efficient (%)
Intervention group	49	18 (36.73)	28 (57.14)	3 (6.12)	93.88
Control group	49	11 (22.45)	27 (55.10)	11 (22.45)	77.55
χ^2 value	-	-	-	-	5.333
P value	-	-	-	-	0.021

Table 5. Comparison of quality of life scores between the two groups after nursing ($\bar{x} \pm SD$)

Project	Intervention group (n = 49)	Control group (n = 49)	t value	P value
GH	83.84 ± 6.71	71.28 ± 6.51	9.404	< 0.001
RP	84.91 ± 5.74	69.13 ± 5.87	13.450	< 0.001
PF	81.05 ± 5.18	63.61 ± 5.13	16.750	< 0.001
SF	86.13 ± 5.21	70.97 ± 5.29	14.290	< 0.001
RE	78.92 ± 4.67	67.24 ± 4.31	12.870	< 0.001
MH	88.21 ± 4.46	70.38 ± 4.32	20.101	< 0.001

ized repeatedly, leading to high medical expenses. Causing negative psychological emotions, such as irritability, anxiety and depression, and these emotions will aggravate the psychological burden of patients with CHF [24]. Statistically, most patients with CHF have negative emotions, which play an important role in the occurrence, development and prognosis of CHF [25]. Patients with CHF lose self-confidence, show negative attitudes and lack patience for long-term medication, causing fear of medication, reducing the effect of clinical treatment and cardiac dysfunction [26]. Johansson et al. [27] suggested health education, social support, exercise therapy and stress management are effective interventions for patients with CHF. A series of comprehensive nursing measures, such as education, diet, psychology and rehabilitation, are targeted for these patients. Data show that nursing efficiency of the intervention group was significantly higher than that of the control group. LVEF of the intervention group and the control group significantly increased while LVDs significantly decreased compared with that before nursing. Compared to the control group, LVEF of intervention group was higher while LVDs was lower after nursing. In the intervention group

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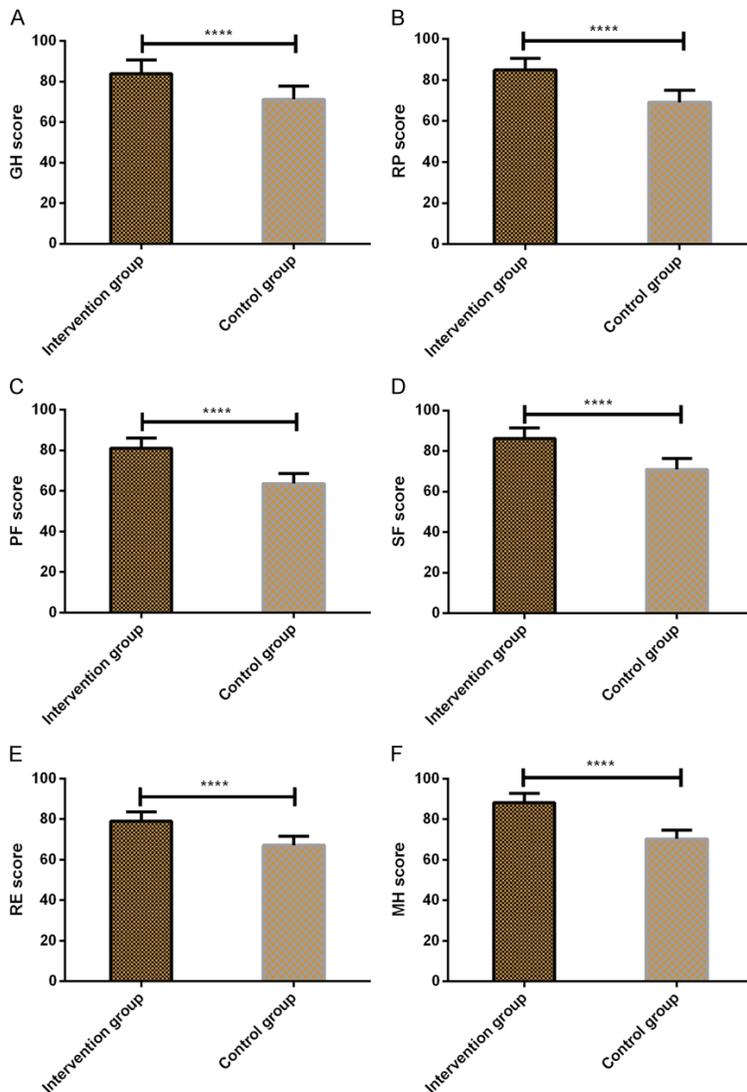


Figure 3. Quality of life scores after nursing in two groups. The results of GH score after nursing (A), RP score after nursing (B), PF score after nursing (C), SF score after nursing (D), RE score after nursing (E) and MH score after nursing (F) were compared between the two groups. Note: **** indicates $P < 0.001$ compared with the control group.

and the control group, SAS and SDS scores were significantly lower than those before nursing, and those in intervention group were significantly lower than those in the control group after nursing.

Jenkins et al. reported that heart failure could result in renal impairment, and comprehensive nursing could reduce the incidence of renal impairment and alleviate disease progression, so as to effectively improve the prognosis of patients with heart failure combined with renal impairment [28]. Comprehensive nursing can improve the conditions and reduce negative

emotions of patients. Early education help patients know more about the disease. Targeted psychological nursing can eliminate the psychological barriers and establish self-confidence in patients. Effective dietary nursing can help patients to establish good living habits. Reasonable rehabilitation training helps the recovery of patients and improves immunity to disease.

Quality of life has been an important way to evaluate the prognosis of various diseases [29, 30]. A follow-up survey was conducted on quality of life of patients with CHF after nursing. Data showed that GH score, RP score, PF score, PF score, SF score, RE score and MH score in QLQ items in the intervention group were significantly higher than those in the control group after nursing, indicating that comprehensive nursing could improve quality of life of patients with CHF. Wang et al. [31] demonstrated that supportive education and nursing programs could reduce fatigue and improve quality of life of patients with heart failure. Unlike comprehensive nursing, supportive education nursing is a kind of psychological nursing intervention for patients [32] while comprehensive nursing

is all-round treatment for patients. Based on a nursing satisfaction survey, the nursing satisfaction of the intervention group was significantly higher than that of the control group, indicating that comprehensive nursing could be accepted by patients, which provided a strong basis for the application and promotion of comprehensive nursing in patients with CHF.

This study proved that comprehensive nursing measures have good benefits for patients with CHF while the study design still has some flaws. First, quality of life of patients with CHF before nursing has not been evaluated. Second, treat-

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Table 6. Comparison of nursing satisfaction results after two groups of nursing intervention [n (%)]

Group	n	Very satisfied	Satisfaction	Not satisfied	Nursing satisfaction (%)
Intervention group	49	19 (38.78)	27 (55.10)	3 (6.12)	93.88
Control group	49	14 (28.57)	20 (40.82)	15 (30.61)	69.39
χ^2 value	-	-	-	-	9.800
P value	-	-	-	-	0.002

ment adherence of patients with CHF was not assessed. Additionally, the treatment adherence of CHF patients was not evaluated. More investigation needs to be conducted in the future.

To sum up, comprehensive nursing plays an important role in promoting the recovery of patients with CHF, which can reduce negative emotions, improve quality of life and nursing satisfaction of patients.

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Disclosure of conflict of interest

None.

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