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Original Article

Value of continuing nursing in chronic heart failure and its effect on patients' cardiac function improvement

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Abstract: Objective: To investigate the effect of continuing nursing on chronic heart failure and its effect on the improvement of cardiac function. Methods: Ninety patients with chronic heart failure treated in Nursing School, Sias International University from April 2016 to August 2017 were included in this study. Using the digital random table method, participants were divided into observation groups (n=45 cases) and control group (n=45 cases) according to the retrospectively analyzed clinical data. Conventional intervention was used for the control group, and continuing nursing intervention was used for the observation group. Then the changes of cardiac function, quality of life, cognitive function, psychological state and treatment compliance before and after intervention in the two groups were compared. In addition, patients' satisfaction of nursing care was also compared. Results: Some cardiac function indexes which includes left ventricular ejection fraction, fraction shortening and 6-minute walk test, Minnesota living with heart failure questionnaire and mini-mental state examination scores after intervention were significantly higher than those before the intervention (all P<0.001). Moreover, scores of the observation group were significantly higher than those of the control group (all P<0.01); additionally, both self-rating anxiety scale and self-rating depression scale scores in the two groups after intervention were significantly lower than those before intervention (all P<0.001) and the scores of the observation group was significantly lower than those of the control group (both P<0.01). The evaluation index of treatment compliance in the observation group was significantly better than that in the control group (all P<0.05) and the satisfaction of the observation group was significantly higher than that of the control group (P=0.027). Conclusion: Continuing nursing care for patients with chronic heart failure can significantly improve their clinical symptoms, strengthen their cardiac and cognitive function, and relieve their anxiety. What's more, the patients' high treatment compliance has a significant effect on the improvement of their quality of life.

Keywords: Continuing nursing, chronic heart failure, quality of life, psychology, compliance, safety

Introduction

Chronic heart failure refers to the chronic comprehensive disease caused by the degeneration and damage of the heart structure or its functional state resulting in dysfunction of ventricular filling or ejection. It is the ultimate outcome of the development of various types of heart disease. Chronic heart failure is prone to induce a variety of complications, with a long-term course of disease, high recurrence rate, high readmission rate, and then more burden are brought to patients and their family [1-4]. Nowadays, changes of people's lifestyle and the acceleration of the life pace, have been driving the prevalence of chronic heart failure. With the continuous advancement of modern medicine, the goal of treatment to patients with chronic heart failure not only improves their clinical symptoms, but also effectively relieves their adverse emotions, and further improves their quality of life. At the same time, readmission can be avoided with increased survival rate [5]. Besides, patients with chronic heart failure mostly receive the treatment at home after hospital discharge, so the scientific and effective intervention model is the key to curb progression of this disease.

In the past, conventional clinical care model was used in patients with chronic heart failure; however, it lacks targeted and personalized post-hospital guidance, which made some patients unable to solve the existing problems

in a timely manner after leaving hospital, which was detrimental to disease control, leading to high readmission rate. Giving that the continuous nursing model is an intervention measure that extends hospital-related services to each patient's family, it has been widely implemented in patients with hypertension and plays a positive role in stabilizing blood pressure and improving their quality of life [6]. However, there are currently few clinical reports on continuing nursing intervention for other chronic diseases, especially there is no study about the improvement of cardiac function brought by the continuing nursing intervention. Therefore, we would like to explore the clinical value of continuing nursing intervention in patients with chronic heart failure. Ninety patients with chronic heart failure on intervention treatment from April 2016 to August 2017 are included to observe its effect on the patient's cardiac function, quality of life, mental status, cognitive function and many other aspects. The results are as follows.

Materials and methods

General information

A total of 90 patients with chronic heart failure treated in the Department of Cardiology of Nursing School, Sias International University from April 2016 to August 2017 were included in this study. This study was examined and approved by the Medical Ethics Committee of Nursing School, Sias International University, and the participants themselves and their families signed informed consent. All participating patients were divided into observation group (n=45) and control group (n=45) according to the random number table method.

Inclusion criteria: (1) The enrolled patients met the diagnostic criteria for the disease in the Guideline for the Diagnosis and Treatment of Chronic Heart Failure (2007), and their cardiac function were confirmed in grade II to IV according to the NYHA classification [7]; (2) Patients had normal mental status and good understanding ability; (3) Patients had no malignant tumor; (4) Patients had normal limb function.

Exclusion criteria: (1) Patients with severe organic diseases such as stomach, liver, and kidney illness; (2) Patients still with unstable condition after treatment; (3) Patients with congenital heart disease; (4) Patients with cardiomyopathy or cardiac valve disease; (5) Patients with poor compliance who couldn't follow the doctor's advice.

Methods

The control group took conventional interventions: the relevant medical staff gave oral or written knowledge guidance about chronic heart failure during hospitalization until discharge, including daily diet, rest and exercise, medication, return visit, condition observation, etc. The patients should be informed one day in advance of the outpatient review every 3 months after discharge.

The observation group adopted continuing nursing intervention: (1) Telephone follow-up: The relevant medical staff should conduct at least one telephone follow-up every week within one month after hospital discharge and at least 1 telephone follow-up every two weeks at the second and third months after hospital discharge. Telephone follow-up might involve the consolidation of chronic heart failure knowledge, guidance of daily life habits, aerobic exercise and rest, self-condition detection, psychological intervention, etc. During the follow-up, medical staff should record the relevant content in details and submit it to the superior doctor for evaluation. (2) Family follow-up: At the second week after hospital discharge, at least one family visit every month should be conducted. Comprehensive assessment of the patient's condition should be firstly finished during family follow-up to acquaint their daily salt intake, compliance medication, cardiac function, quality of life and mental status. Then appropriate measures could be developed based on individual conditions and they would be checked in the next home visit; secondly, the patient's medication situation and daily dose were carefully evaluated; thirdly, movement guidance was given according to the patient's cardiac function status. Activities contained climbing stairs, outdoor walking, Tai Chi, etc. In addition, patients with cardiac function in grade II could take all exercise, like outdoor walking (700 m/time, 1~2 times/d), climbing stairs (15 min/time, 1~2 times/d), Tai Chi, Qigong, etc. As for patients with cardiac function in grade III, they were limited to take all exercise, except indoor walking (15 min/time, 1~2 times/d). Patients

Table 1. Comparison of clinical outcome data in both groups

Group	Gender		Age (years)	Mean course of disease (years)	NYHA classification		
	Male	Female			II	III	IV
Observation (n=45)	26	19	62.55±3.01	5.60±1.06	15	20	10
Control (n=45)	25	20	62.49±3.11	5.73±1.04	16	18	11
t/X^2	0.045		0.093	0.587	0.185		
P	0.832		0.926	0.559	0.912		

Note: NYHA, New York heart association.

with cardiac function in grade IV needed absolute bed rest, and the family should be asked to assist patients with appropriate massage and passive activities (15 min/time, 1~2 times/d). Fourth, assessment of the patient's daily diet was taken, the patient should be informed of light diet, instead of high-fat and high-salt foods, and they should drink adequate water rather than eating too much [8]. Concretely, patients in grade II, III and IV should intake less than 5 g, 2.5 g and 1 g of daily salt, respectively. Fifth, patients were told to actively participate in the lectures of health knowledge held by the hospital. During the lectures, doctors would actively interact with their patients to remove their doubts, correct their erroneous perceptions, and show exact demonstrations. Both groups were consecutively intervened for 6 months, and the curative effect was evaluated after the intervention.

Outcome measures

(1) Left ventricular ejection fraction (LVEF) and fraction shortening (FS) were measured by echocardiography before and after intervention for two groups, and 6-minute walk test (6MWT) before and after intervention of two groups were recorded. (2) According to the Minnesota living with heart failure questionnaire (MLHFQ) scale, the quality of life of patients in the two groups before and after six months' intervention was evaluated. And the higher the score is, the better the quality of life will be [9]. (3) The mini-mental state examination (MMSE) scale was used to measure the cognitive function before and after six-month intervention. The cognitive function will be better with the increasing scores [10]. (4) The self-rating anxiety scale (SAS) and self-rating depression scale (SDS) were used to evaluate the psychological status before and after six-month intervention, respectively. The higher the score is, the more severe the anxiety and depression state will be [11, 12]. (5) The self-made questionnaire was used to assess the treatment compliance after six-month intervention. The survey involved following the medical instructions, good mental state, taking proper medicine timely, reasonable aerobic exercise, smoking cessation and abstinence. The complete compliance was defined that the patient's completion rate of above five goals was over 90%; otherwise, that was the incomplete. (6) Satisfaction of nursing care was evaluated after 6 months of intervention by self-made satisfaction rating scale with 100 points. More than 85 were defined as satisfied, 70 to 84 as basically satisfied, less than 70 points as not satisfied, satisfaction = number of (satisfied + basically satisfied) cases/number of total cases * 100%.

Statistical analysis

SPSS20.0 software was used to analyze data. Measurement data were expressed as mean ± standard deviation ($\bar{x}$ ± sd). Paired t test was used before and after intervention within groups. Independent sample t test was used for comparison between the two groups. Count data was expressed as ratio and X^2 test was used. The difference is statistically significant at $P<0.05$.

Results

Comparison of clinical data

The main clinical baseline data such as gender, age, mean course of disease, and New York Heart Association classification of cardiac function in the two groups were not statistically significant (all $P>0.05$). See **Table 1**.

Comparison of cardiac function before and after intervention

There was no significant difference in the indexes of cardiac function between the two groups before intervention (all $P>0.05$). However, after intervention, LVEF, FS and 6MWT in the two groups were significantly higher than those before the intervention (all $P<0.001$), and the

Table 2. Comparison of cardiac function before and after intervention in both groups ($\bar{x}$ ± sd)

Group	Time	LVEF (%)	FS (%)	6MWT (m)
Control (n=45)	Before intervention	32.09±5.87###	20.45±4.79###	335.88±47.60###
	After intervention	45.44±5.81	26.45±3.06	427.48±49.02
	Difference before and after intervention	13.35±0.89	6.00±0.91	91.60±18.76
Observation (n=45)	Before intervention	32.11±5.98###	20.46±4.81###	336.19±48.97###
	After intervention	50.06±6.03**	34.22±3.10**	511.49±50.36**
	Difference before and after intervention	17.95±1.03***	13.76±0.88***	175.30±20.04***

Note: Comparison with control group, **P<0.01, ***P<0.001; comparison with after intervention within group, ###P<0.001. LVEF, left ventricular ejection fraction; FS, fraction shortening; 6MWT, 6-minute walk test.

Table 3. Comparison of scores of MLHFQ and MMSE scales before and after intervention in both groups ($\bar{x}$ ± sd)

Group	Time	MLHFQ scale	MMSE scale
Control (n=45)	Before intervention	58.31±7.60###	15.40±3.07###
	After intervention	73.22±9.63	22.30±2.86
	Difference before and after intervention	14.91±1.98	6.90±0.91
Observation (n=45)	Before intervention	58.29±7.54###	15.44±3.08###
	After intervention	80.09±10.57**	26.11±2.91**
	Difference before and after intervention	21.80±2.61***	10.67±0.87***

Note: Comparison with control group, **P<0.01, ***P<0.001; comparison with after intervention within group, ###P<0.001. MLHFQ, Minnesota living with heart failure questionnaire; MMSE, mini-mental state examination.

Table 4. Comparison of psychological status before and after intervention in both groups ($\bar{x}$ ± sd)

Group	Time	SAS	SDS
Control (n=45)	Before intervention	52.28±8.77###	51.97±9.78###
	After intervention	45.60±6.15	46.14±6.02
	Difference before and after intervention	6.68±1.73	4.53±1.23
Observation (n=45)	Before intervention	52.33±9.10###	52.61±8.56###
	After intervention	33.44±7.96**	41.60±6.12**
	Difference before and after intervention	18.89±1.78***	9.01±1.09***

Note: Comparison with control group, **P<0.01, ***P<0.001; comparison with after intervention within group, ###P<0.001. SAS, self-rating anxiety scale; SDS, self-rating depression scale.

indexes of observation group were significantly higher than those of the control group (all P<0.01). See **Table 2**.

Comparison of scores of MLHFQ and MMSE before and after intervention

There was no significant difference in the scores of MLHFQ and MMSE between the two groups before the intervention of different nursing modes (both P>0.05). The MLHFQ and MMSE scores of the two groups after intervention were significantly higher than those before interventions (all P<0.001). And scores of the observation group were significantly higher than those of the control group (both P<0.01). See **Table 3**.

Comparison of psychological status before and after intervention

There was no significant difference in the psychological status of the two groups before the intervention (both P>0.05). The SAS and SDS scores in the two groups after intervention were significantly lower than those before the intervention (all P<0.001), and the scores of observation group were significantly lower than those of the control group (both P<0.01). See **Table 4** and **Figure 1**.

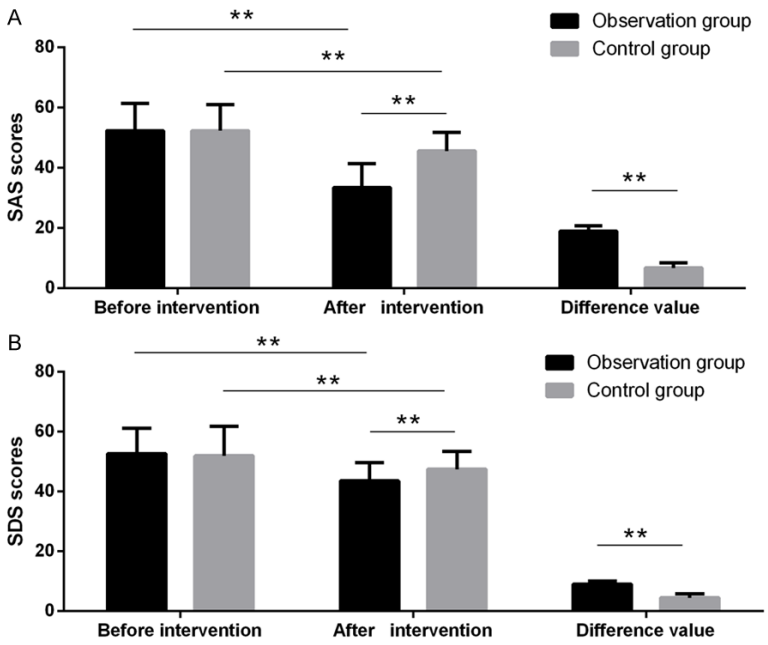

Figure 1. Comparison of psychological status before and after intervention in both groups. A: SAS scores. B: SDS scores. Comparison of psychological status before and after intervention in 2 groups, **P<0.01.

Comparison of treatment compliance

The evaluation indicators of treatment compliance in the observation group were significantly better than those in the control group, with statistically significant difference (all P<0.05). See **Table 5**.

Satisfaction evaluation

The satisfaction of the observation group was significantly higher than that of the control group, with statistically significant difference (P=0.027). See **Table 6**.

Discussion

Chronic heart failure is a common disease with high incidence in the cardiology department. According to epidemiological investigations, its incidence in the United States, Europe and China is 5.7 million, 15 million and 4.5 million, respectively; and it is the ultimate outcome of most cardiovascular and cerebrovascular diseases, and is also the main cause of high mortality [13]. As the cause of chronic heart failure is rather complex, the condition is protracted and refractory, and the main purpose of treatment in current clinical practice is to improve the clinical symptoms of patients and prolong their lives so there will be long-term disease survival for most patients [14]. Some studies have found that reasonable and scientific nursing interventions for patients with chronic heart failure can significantly increase their survival rate [15]. However, due to the impact of strained doctor-patient relationship and low patient satisfaction, it is urgently needed to seek practical possible care mode and its effective transformation is the key to cardiovascular care.

Continuing care is defined as a series of scientific actions designed to ensure that patients receive varying degrees of synergistic and continuous care on different occasions, which in turn eases the condition. Nowadays, there is no report on the effect of continuing nursing on the cardiac function in patients with chronic heart failure, but some scholars have reported that the use of comprehensive interventions can effectively improve their cardiac function [16]. In this study, 90 patients with chronic heart failure were included in the continuing nursing model to observe its effects on the patient's cardiac function, quality of life, etc. The results of this study showed that LVEF, FS, and 6MWT were significantly higher after intervention, and were significantly higher in the observation group than in the control group. The SAS and SDS scores in the two groups after intervention were both significantly lower than those before intervention, and the observation group was significantly lower than the control group, showing that the continuing nursing intervention can significantly improve the patients' cardiac function. It may lie in that this intervention can make up for the inadequacies of conventional interventions through telephone and family follow-up; this methods were applied in patient's family, to help them establish a positive and correct after-hospital behavior, correct their original poor behavior, and further improve their understanding the condition, in order to eliminate patients' adverse emotions,

Table 5. Comparison of treatment compliance in both groups

Group	Following the medical instructions	Good mental state	Smoking cessation and abstinence	Taking proper medicine timely	Reasonable aerobic exercise
Observation (n=45)	43	40	38	42	37
Control (n=45)	35	32	25	35	24
X^2	6.154	4.444	8.942	4.406	8.598
P	0.013	0.035	0.003	0.036	0.003

Table 6. Patient satisfaction evaluation in both groups

Group	Satisfied	Basically satisfied	Not satisfied	Satisfaction (n, %)
Observation (n=45)	26	15	4	41 (91.11)
Control (n=45)	20	13	12	33 (73.33)
X^2				4.865
P				0.027

and finally improve their treatment compliance [17].

The MLHFQ and MMSE scales can better reflect patients' quality of life and cognitive function, respectively. Clinically, approximately 25% to 50% of patients with chronic heart failure have different levels of cognitive impairment, thus obviously affecting their quality of life. The results of this study showed that the MLHFQ and MMSE scales were significantly higher in both groups after intervention than those before intervention. And scores of the observation group was significantly higher than those of the control group. It may be that continuing nursing fully shows the people-centered nursing concept and the modern high-quality nursing concept. It further unifies the health care and the patient's coherence, and reflects the timeliness, effectiveness, initiative and continuity of nursing care to the greatest extent. It can relieve anxiety and depression and suppress the development of the condition [18, 19].

According to clinical studies, about 80% of patients return to their original lifestyle after discharge, and keep their unhealthy living habits [20, 21]. That is, knowledge propaganda and health education during hospitalization did not work, leading to recurrence of illness further reduced patients' compliance and satisfaction. The results of this study showed that the evaluation indicators and nursing satisfaction of the observation group were significantly better than the control group, and the difference was statistically significant. It shows that continuing nursing can significantly improve patients' treatment compliance and satisfaction, can better enable patients to comprehend the content of health promotion and effectively implement it even they leave the hospital, and can also enable the medical staff to understand the status and problems of the patients' life after hospital discharge; then to improve their bad habits, improve their treatment compliance, prevent the development of the disease [22, 23]. However, owing to small amount of samples, short study time, and lack of multicenter and large-scale parallel research, further research is needed.

In summary, the continuing nursing for patients with chronic heart failure can significantly improve their clinical symptoms, cardiac function and cognitive function. In addition, it can ease their negative emotions, raise their treatment compliance, and finally improve their quality of life. This improvement has a significant effect, good results, and worthy of clinical application.

Disclosure of conflict of interest

None.

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