

## Original Article

# The influence of integrated healthcare on the nursing effect, negative emotions, and heart failure indicators in acute heart failure patients

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**Abstract:** Objective: To investigate the effect of integrated healthcare on the nursing of heart failure patients, as well as its influence on the negative emotions and the factors related to heart failure. Methods: 150 patients with acute heart failure admitted to our hospital were randomly divided into two groups. The patients in the control group underwent routine care, and the patients in the research group were treated with integrated healthcare. The two groups' general information, symptom improvements, six-minute walking distances, emotional conditions, quality of life (MLHFQ scores), N-terminal brain natriuretic peptide (NT-proBNP) levels, mortality rates, rehospitalization rates, and satisfaction rates were compared. Results: The time required for symptom improvement in the research group was shorter than it was in the control group ( $P < 0.001$ ). The patients' six-minute walking distances in the research group were longer than the distances in the control group ( $P < 0.001$ ). There were no differences in the emotional changes between the two groups before the nursing ( $P > 0.05$ ), but after the nursing, the negative emotion scores in the research group were significantly decreased when compared with the control group ( $P < 0.001$ ). The MLHFQ scores and the NT-proBNP levels in the research group were both lower than they were in the control group ( $P < 0.001$ ). No significant differences were observed between the two groups in their mortality or rehospitalization rates ( $P > 0.05$ ). However, the patient satisfaction rates in the research group was higher than they were in the control group ( $P < 0.05$ ). Conclusion: As a care plan for patients with acute heart failure, the integrated healthcare plan significantly relieved the patients' anxiety and efficiently improved the patients' quality of life, an indication that integrated healthcare is worth promoting and applying clinically.

**Keywords:** Integrated healthcare, acute heart failure, nursing effect, negative emotions, heart failure factor, effect

## Introduction

Heart failure is the terminal end-stage of various heart diseases. With a gradual decline of diastolic and systolic function of the heart, the heart's arterial flow is significantly reduced concomitantly with the stasis of the venous flow. The patients' physical and mental health are therefore seriously impaired due to the reduction of the arterial flow. Thus, timely and regular treatment are crucial for the patients [1]. However, the patients' existing disease and physical factors lead to high risks during the heart failure treatment process. Thus, effective and timely nursing measures are still required to improve the treatment safety [2].

Over the past decades, patients have commonly undergone routine nursing in the clinic, a

practice that has significant shortcomings. Since the routine care is unable to provide targeted patient care, the patients' requirements are barely met, and the quality and efficiency of the nursing services are not improved. Therefore, routine care is unable to ensure a positive treatment effect and has been gradually eliminated in clinical practice [3].

Integrated healthcare, a novel nursing model concept, has been commonly applied clinically. Based on the patients' requirements, integrated healthcare provides patients with satisfactory services through the collaboration of doctors and nurses. This cooperation motivates patients to overcome their disease and complete their treatment [4]. Moreover, it also improves the efficiency and quality of clinical nursing, and it increases the patients' satisfac-

tion rate [5]. Nevertheless, few studies have focused on the effect of integrated healthcare on heart failure patients, so further research is still required. Hoping to provide new information on the nursing effect in integrated healthcare on heart failure patients, our study involved a comprehensive analysis that explored the impact of integrated healthcare on the heart failure factors and the negative emotions of heart failure patients.

### Materials and methods

#### *General materials*

This is a retrospective study that recruited 150 patients with acute heart failure admitted to our hospital from January 2019 to June 2020. They were randomly divided into two groups, with 75 cases in the research group, which consisted of 41 males and 34 females, and 75 cases in the control group, which included 42 males and 33 females.

Inclusion criteria: (1) Patients who met the diagnostic criteria for acute heart failure [6]. (2) Patients  $\geq 18$  years old. (3) Patients with normal cognitive abilities. (4) Patients who signed the informed consent forms.

Exclusion criteria: (1) Patients in a confused state. (2) Patients with abnormal liver or kidney function. (3) Patients with missing data. (4) Patients with severe cardiovascular disease or a physical disability. (5) Patients comorbid with malignant tumors. This study was reviewed and approved by our hospital's ethics committee.

#### *Methods*

**Control group:** The patients underwent routine care. Specific nursing measures, such as health education, psychological counseling, diet guidance, and exercise guidance were provided to the patients according to their conditions.

**Research group:** The patients were treated using integrated healthcare [7]. It included the following measures:

(1) **Team establishment:** one attending physician, one head nurse, and eight nursing staff were selected to build the team. To ensure the effectiveness of the integrated healthcare, the attending physician is responsible for educating the patients about heart failure to help the

patients understand the severity of heart failure, its symptoms, its first aid measures, and its nursing measures. (2) **Assessment:** A comprehensive assessment related to the patients, including the disease severity, their education, and their psychological and mental states was performed by the nursing staff after their admission to the hospital. The specific care plan, including the diagnosis, treatment, nursing methods, and intensive nursing for the specialty and the basic nursing, was discussed and established based on the assessment. The urine collection, sodium intake control, and weight management instructions were provided by the nursing staff. The doctors inquired about the patients' conditions and provided guidance to the patients during their daily rounds, and the diet follow-up and supervision were performed by the head nurse, and any problems were corrected promptly. (3) **Health education:** a lack of understanding related to the disease might result in the progress of the disease; therefore, intensive health education still needs to be organized by the nursing staff in each ward. Based on the professional materials prepared by the attending physician, the nursing staff provided explanations to help the patients and family members to get a correct understanding of the disease hazards. Sharing such knowledge could also improve the patients' self-care awareness and cooperation. Also, instruction on the administration of medication involving the medication times and dosages prescribed by the doctors is also necessary for improving the condition of the disease. (4) **Nursing:** according to each patient's assessment, the team members are responsible for the different nursing components respectively, such as diet and life intervention. Moreover, the patients should be convinced to quit smoking and drinking alcohol to ensure their sleep quality. (5) **Discharge guidance:** Intensive health education for patient self-management was organized by the team members, and how to take their medication on time was explained to the patients. In addition, the regular consultations were carried out.

#### *Observed indicators*

(1) The general data of the two groups were compared.

(2) The symptoms related to the improvement were compared between the two groups, and a

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**Table 1.** Baseline patient data ( $\bar{x} \pm sd$ )

Items	Control group (n=75)	Research group (n=75)	$\chi^2/t$	P
Age (years)	69.4±4.6	68.6±4.9	1.031	0.304
Sex (male/female)	42/33	41/34	0.056	0.813
BMI (kg/m <sup>2</sup> )	23.71±2.52	23.53±3.97	0.332	0.741
Concurrent myocardial infraction (cases)	36	31	0.674	0.866
Concurrent diabetes (cases)	28	23	0.743	0.389
Concurrent hypertension (cases)	61	69	3.692	0.055
Concurrent hyperlipidemia (cases)	35	44	2.752	0.097

Note: BMI: Body mass index.

**Table 2.** Comparisons of the symptom improvement and the six-minute walk distances between the two groups ( $\bar{x} \pm sd$ )

Group	The time of symptom improvement (d)	Six-minute walking distance (m)
Control group (n=75)	6.63±1.84	278.24±32.46
Research group (n=75)	4.34±0.95	303.81±41.15
t	9.577	4.225
P	0.000	0.000

six-minute walk test was used to record the 6 min walking distances of the patients. The symptom of improvement: Compared with the situation before the nursing, the increase in the heart atrial flow was >70.0%, and the frequency of the disease attacks decreased significantly.

(3) The anxiety and depression scales were used to compare the emotional differences of the patients in the two groups [8].

Anxiety: Severe anxiety:  $\geq 70$  points; Moderate anxiety: 60-69 points; Mild anxiety: 50-59 points; No anxiety <50 points. Depression: Severe depression:  $\geq 73$  points; Moderate depression: 63-72 points; Mild depression: 53-62 points; No depression: <53 points.

(4) The Minnesota Living with Heart Failure Questionnaire (MLHFQ) was used to evaluate the patients' quality of life: Two time points, including the time of admission to the hospital and a half-year after discharge, were selected to evaluate the patients' quality of life. The scale has a total possible score of 105 points, and a lower score indicates better quality of life [9]. The MLHFQ scale primarily assesses whether patients are experiencing the following existing symptoms: swelling in the ankles or legs; resting (sitting or lying) during the day; difficulty walking or climbing stairs; difficulty work-

ing around the house; difficulty going away from home; sleep problems; difficulty doing things with friends or family; difficulty of working to earn a living, difficulty enjoying recreational pastimes, exercise, and favorites; difficulty of sexual life; eating less of their favorite foods; shortness of breath; fatigue, tiredness or being low on energy; required to stay in the hospital; costing money for medical care;

side effects from medication; feeling burdensome for your friends or family; feeling a loss of self-control; worry; the difficulty of remembering or concentrating; or feeling depressed.

(5) Comparing the N-terminal brain natriuretic peptide (NT-proBNP) levels between the two groups: fasting venous blood at admission and discharge was collected and analyzed using enzyme-linked immunosorbent assays [10].

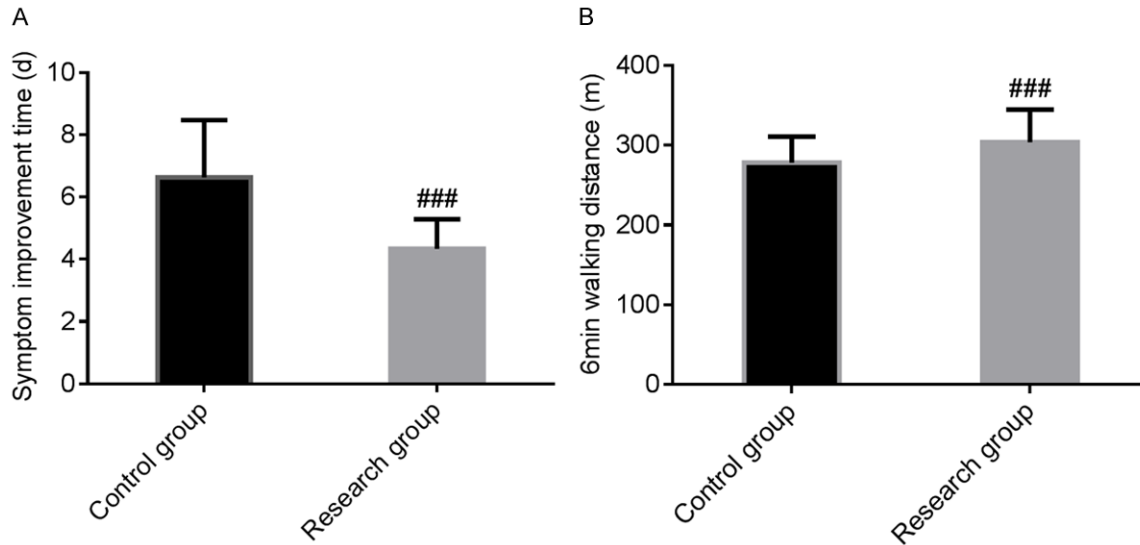
(6) Comparison of the mortality rates, the rehospitalization rates, and the satisfaction rates between two groups.

Satisfaction rate: satisfied >90 points; basically satisfied: 70-90 points; dissatisfied: <70 points [11]. Satisfaction index = (the number of satisfied cases + the number of basically satisfied cases)/total case number  $\times 100$ .

### Statistical analysis

The data gathered in this study were analyzed using SPSS 24.0. The measurement data were expressed as  $\bar{x} \pm sd$ , paired t-tests were used for the comparisons between groups. The count data are shown as n (%), and  $\chi^2$  tests were performed for the comparisons.  $P < 0.05$  indicated a difference is statistically significant.

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**Figure 1.** Comparisons of the symptom improvement and the six-minute walk distances between two groups. A: The symptom improvement times; B: The six-minute walking distances. Compared with the control group, ### $P < 0.001$ .

**Table 3.** Comparison of the emotional condition ( $\bar{x} \pm sd$ , score)

Group	Anxiety		Depression	
	Before nursing	After nursing	Before nursing	After nursing
Control group (n=75)	73.75±10.39	68.17±10.45***	82.23±10.31	60.67±10.68***
Research group (n=75)	72.38±10.46	42.44±10.16***	81.92±10.55	41.51±10.47***
t	0.805	15.289	0.182	11.303
P	0.422	0.000	0.856	0.000

Note: compared with the scores before the nursing, \*\*\* $P < 0.001$ .

**Table 4.** Comparison of the MLHFQ scores between the two groups ( $\bar{x} \pm sd$ , score)

Group	Before nursing	After nursing
Control group (n=75)	66.89±12.31	53.32±7.35***
Research group (n=75)	65.26±10.76	31.84±7.86***
t	0.863	17.287
P	0.389	0.000

Note: compared with the scores before the nursing, \*\*\* $P < 0.001$ . MLHFQ: quality of life.

## Results

### *A comparison of the general clinical data between the two groups*

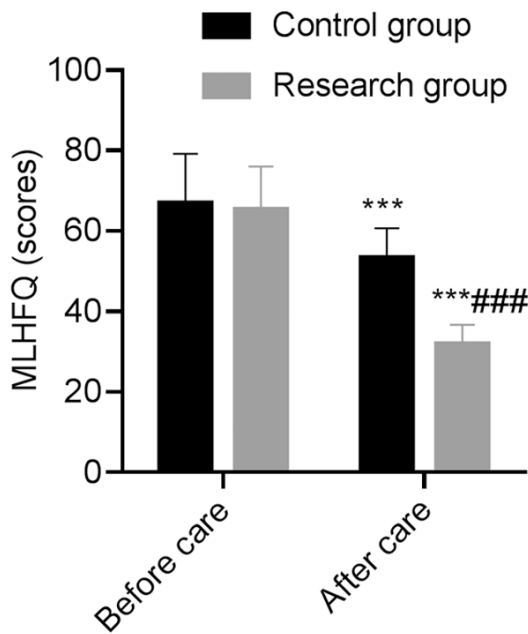
There were no significance differences in terms age, gender, BMI, or concomitant diseases of the patients between the two groups ( $P > 0.05$ ; **Table 1**).

### *Comparisons of the symptom improvement and six-minute walk distances between the two groups*

The required time for the symptom improvement in the research group was shorter than it was in the control group ( $P < 0.001$ ), and the 6 min walking distances of the patients in the research group were longer than they were in the control group ( $P < 0.001$ ; **Table 2** and **Figure 1**).

### *Comparison of the emotional situations of the patients in the two groups*

Before the nursing, there were no significant differences in the anxiety and depression scores of the patients in the two groups ( $P > 0.05$ ). However, after the nursing, the anxiety and depression scores of the two groups were both significantly decreased in compari-



**Figure 2.** Comparison of the MLHFQ scores. Compared with the scores before the nursing, \*\*\* $P < 0.001$ ; Compared with the control group, ### $P < 0.001$ . MLHFQ: quality of life.

son to the scores before the nursing. Moreover, after the nursing, the anxiety and depression scores in the research group were significantly lower than they were in the control group ( $P < 0.001$ ; **Table 3**).

*Comparison of the quality of life between the two groups*

Before the nursing, there was no significant difference in the MLHFQ scores between the two groups ( $P > 0.05$ ). After the nursing, the MLHFQ scores in the two groups were significantly decreased when compared with the scores before the nursing. In addition, the MLHFQ scores in the research group after the nursing were much lower than they were in the control group ( $P < 0.001$ ; **Table 4** and **Figure 2**).

*Comparison of the NT-proBNP levels between the two groups*

A non-significant difference in the NT-proBNP levels between the two groups was observed ( $P > 0.05$ ) before the nursing, and the NT-proBNP volumes decreased significantly in the two groups after the nursing. Moreover, the decrease of the NT-proBNP level in the research group was greater when compared

with the change in the control group ( $P < 0.001$ ; **Table 5** and **Figure 3**).

*Comparisons of the mortality, rehospitalization, and satisfaction rates between two groups*

There were no significant differences in the mortality or rehospitalization rates between the two groups ( $P > 0.05$ ). The satisfaction rate of the patients in the research group was significantly higher than it was in the control group ( $P < 0.05$ ; **Table 6**).

**Discussion**

Heart failure is a common life-threatening disease with a rapid progression in the clinic. As a routine therapy, the effects of the medication are closely associated with effective nursing [12]. With the improvement of medical standards, integrated healthcare has been gradually applied in the clinic [13].

As an improvement and extension of conventional nursing, integrated healthcare with the collaboration of doctors and nurses can elevate work enthusiasm and improve the nursing quality significantly [14]. Also, this collaboration can manage patients' conditions more effectively and establish a specific care plan for each patient [15]. Providing information about the disease during nursing further improves the cooperation of the patients. All the above advantages are beneficial for promoting the treatment effect [16]. This study showed that, in the research group, the symptom improvement time was shorter than it was in the control group, and the 6-min walking distance was also extended. Jiang Pan et al. also reported that integrated healthcare can significantly extend the 6 min walking distances of heart failure patients, and it can also improve their heart function and exercise abilities [17]. Their result is consistent with the data of our study. All our evidence indicates that integrated healthcare is effective in the nursing of acute heart failure patients and is able to improve their symptoms more quickly and promote their physical functions [18].

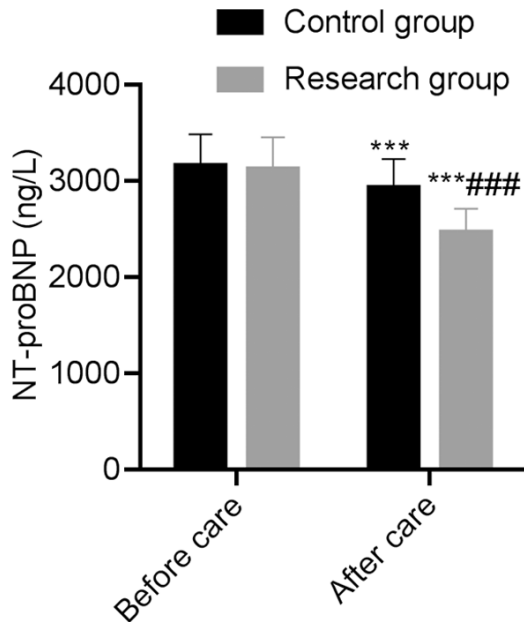
Integrated healthcare can improve the quality of nursing service. The patient-centered nursing method is more conducive to promoting the coordination of patients for their treatment,

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**Table 5.** Comparison of the NT-proBNP levels between the two groups ( $\bar{x} \pm sd$ , ng/L)

Groups	Before nursing	After nursing
Control group (n=75)	3158.45±326.47	2928.44±300.51***
Research group (n=75)	3122.32±333.31	2465.47±244.65***
t	0.671	10.347
P	0.504	0.000

Note: compared with the levels before the nursing, \*\*\*P<0.001. NT-proBNP: N-terminal brain natriuretic peptide.



**Figure 3.** Comparison of the NT-proBNP levels. Compared with the scores before the nursing, \*\*\*P<0.001; Compared with the control group, ###P<0.001. NT-proBNP: N-terminal brain natriuretic peptide.

and it further speeds up the physical recovery. Ultimately, it helps to reduce the NT-proBNP levels [19]. This study observed that the NT-proBNP levels in the research group were lower than they were in the control group. As reported by Lixia Luo, the application of integrated healthcare for heart failure treatment effectively improves the NT-proBNP level of patients with congestive heart failure, elevated their quality of life, and reduces the occurrence of serious cardiovascular events [20]. This is consistent with our results, and suggests that integrated healthcare significantly reduces the NT-proBNP levels of patients with acute heart failure. Comprehensive guidance to patients can effectively improve their heart function, and can lead to a decrease in the

recurrence rate and an elevation of their living conditions [21].

Our study also showed that, after the nursing, the negative emotions score in the research group was significantly lower than it was in the control group, but no significant difference in the emotional change between the two groups without nursing was observed.

Sha Jie et al. reported that integrated healthcare relieves the anxiety and depression of patients undergoing oral cancer surgery, which leads to a significant promotion of clinical efficacy [22]. Our result, consistent with the above report, also suggests that the application of integrated healthcare significantly relieves the unhealthy emotions of patients with acute heart failure. The support and guidance from psychology, talking, and spirit, which were provided to the patients during the process of the integrated healthcare, both resulted in a decrease in their psychological pressure [23].

Our study further showed that, when compared with the control group, the MLHFQ scores, the mortality and rehospitalization rates in the research group were lower, and the satisfaction rate in the research group was higher. Wang Hui et al. found that the nursing satisfaction rate of patients treated using integrated healthcare is as high as 92.40%, which is significantly higher than the previously published data [24]. As shown in this study, we found a similar elevation of the satisfaction level, which indicated that integrated healthcare significantly improves the quality of life of patients with acute heart failure, and results in a marked decrease of the fatality and rehospitalization rates, as well, bringing a significant improvement in the patient satisfaction rate [25]. Through a targeted nursing service to the patients, integrated healthcare significantly elevates the necessity and efficacy of nursing. The improved cooperation of the patients also accelerated the physical recovery. The elevation in the quality of life further induces an increase in the patient satisfaction rate [26]. Integrated healthcare significantly improved the patient's medical experience and provided patients with more systematic, comprehensive, and scientific nursing services. Since the patients underwent better nursing services from every aspect, the application of integrated

**Table 6.** Comparisons of the mortality, rehospitalization, and satisfaction rates in the two groups (n, %)

Group	Mortality	Rehospitalization rate	Satisfaction rate
Control group (n=75)	7 (9.3)	16 (21.3)	66 (88.0)
Research group (n=75)	2 (2.7)	11 (14.7)	73 (97.3)
$\chi^2$	1.891	1.129	4.807
P	0.169	0.288	0.028

healthcare in the entire medical environment ultimately induced a significant increase in medical and nursing quality which further guaranteed patients to be satisfied with every aspect in the hospital [27, 28].

Nevertheless, certain shortcomings still exist in this study. The small cohort used in this study and the short period of the research might result in the data requiring further verification. However, the significant advantages of integrated healthcare indicate that it will definitely be better applied in various clinical fields in the future.

Thus, as a care plan for patients with acute heart failure, integrated healthcare is of great significance for improving the anxiety and quality of life of patients, so it is worthy of clinical promotion and application.

**Disclosure of conflict of interest**

None.

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