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Evaluation of Individualized Nursing Based on the IKAP Model on Cardiac Function Improvement in Patients with Chronic Heart Failure

Jia Luo

BenQ Medical Center, Suzhou 215000, Jiangsu, China

Abstract: *Objective*: To investigate the impact of individualized nursing based on the IKAP model on cardiac function in patients with chronic heart failure. *Methods*: A total of 112 patients with chronic heart failure admitted from January 2024 to September 2025 were selected and grouped using the random number table method. The control group (56 cases) received conventional nursing, while the observation group (56 cases) received individualized nursing based on the IKAP model. Cardiac function and quality of life were compared between the groups. *Results*: After three months of nursing, the left ventricular ejection fraction (LVEF) in the observation group was significantly higher than that in the control group, while the left ventricular end-systolic diameter (LVESD) and left ventricular end-diastolic diameter (LVEDD) were significantly lower than those in the control group ($p < 0.05$). The quality-of-life score in the observation group was significantly lower than that in the control group ($p < 0.05$). *Conclusion*: Individualized nursing based on the IKAP model can effectively improve cardiac function and quality of life in patients with chronic heart failure, and is thus worthy of promotion.

Keywords: Conventional nursing; Chronic heart failure; Individualized nursing based on the IKAP model; Cardiac function; Quality of life

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1. Introduction

Chronic heart failure (CHF) is the primary cause of death and recurrent hospitalizations among patients with cardiovascular diseases [1]. This condition is not an independent disease but rather the end stage of various heart diseases. Due to its prolonged onset, tendency to recur, and poor prognosis, CHF significantly reduces patients' quality of life and leads to continuous deterioration of cardiac function [2]. Early treatment, timely correction of various symptoms, and improvement of quality of life are crucial for enhancing cardiac function and accelerating recovery. Traditionally, routine nursing care has been implemented to support both in-hospital and out-of-hospital treatment; however, it fails to address issues such as information discrepancies and negative emotions in patients, resulting in generally moderate nursing outcomes [3]. The Information-Knowledge-Attitude-Practice (IKAP) theory,

built upon systematic health education, employs progressive nursing to gradually transform health information into patients' internal beliefs, thereby facilitating behavioral changes. In recent years, individualized nursing based on the IKAP concept has been applied in the treatment of chronic diseases such as hypertension, achieving favorable results. However, its application in the management of chronic heart failure remains limited. Therefore, this study selected 112 patients with chronic heart failure to analyze the effects of individualized nursing based on the IKAP model.

2. Materials and methods

2.1. General information

This study employed a prospective nursing design aimed at evaluating the impact of different nursing protocols on patients with chronic heart failure. A total of 112 patients admitted between January 2024 and September 2025 were included in the study. The sample size was calculated using the formula $n1 = n2 = 2[(u\alpha + u\beta) / (\delta/\sigma)]^2 + 0.25\mu\alpha^2$, where n1 and n2 represent the sample sizes of the observation group and the control group, respectively. Initially, the estimated sample size was n1 = n2 = 45 cases, resulting in a total of 90 cases. However, issues such as insufficient data and sample attrition during the study led to an increase in the sample size to n1 = n2 = 56 cases, ultimately determining a total patient sample size of 112 cases.

2.1.1. Control group

(1) Gender

32 males and 24 females

(2) Age

54–81 years, mean (67.84 ± 2.53) years

(3) Disease duration

3–21 years, mean (12.38 ± 2.56) years

(4) Cardiac function classification

Grade III (31 cases), Grade IV (25 cases)

(5) Educational level

Junior high school or below (27 cases), above junior high school (29 cases)

2.1.2. Observation group

(1) Gender

34 males and 22 females

(2) Age

56–80 years, mean (68.43 ± 2.69) years

(3) Disease duration

3–20 years, mean (11.82 ± 2.40) years

(4) Cardiac function classification

Grade III (32 cases), Grade IV (24 cases)

(5) Educational level

Junior high school or below (24 cases), above junior high school (32 cases).

No significant differences were observed between the two groups ($p > 0.05$).

2.1.3. Inclusion criteria

(1) Meeting the diagnostic criteria outlined in the "Guidelines for Primary Care Diagnosis and Treatment of Chronic Heart Failure (2019)" [4].
(2) Normal communication and expression abilities.
(3) Compliance with treatment, nursing, and follow-up instructions as prescribed by the physician.
(4) Informed consent to participate in the study.

2.1.4. Exclusion criteria

(1) Mental disorders
(2) Malignant tumors
(3) Visual or auditory impairments
(4) Loss to follow-up for various reasons during the study

2.2. Methods

2.2.1. Control group

Conventional Nursing: This included dietary management, symptomatic management, vital sign monitoring, medication education, etc. The positive impact of healthy behaviors on the patient's condition and prognosis were repeatedly emphasized to enhance the patient's awareness of their condition. Patients were urged to adhere to the latest medical advice for accurate medication use, maximize the efficacy of medications, monitor for post-medication reactions, and identify and manage various adverse reactions. Active follow-up was conducted after discharge, with telephone or WeChat follow-ups every 4 weeks to understand changes in the patient's condition and patiently answer their disease-related questions.

2.2.2. Observation group

Individualized Nursing Based on the IKAP Model

(1) Information phase

Precise and personalized assessments of patient needs were conducted. One-on-one interviews were held with patients, during which chronic heart failure knowledge questionnaires, self-efficacy scales, and Hamilton Anxiety/Depression Scales were flexibly applied to comprehensively collect patient information, including disease cognition, self-efficacy, emotional state, and lifestyle behaviors. Based on the assessment results, nursing protocols were formulated. For patients with lower educational levels, explanations were provided using visually engaging PPT presentations, knowledge booklets, and videos, with simplified language to reduce understanding difficulties for patients and their families. For patients with higher educational levels, in addition to PPT presentations and booklets, they were arranged to attend lectures and read content uploaded to WeChat official accounts. For patients with significant anxiety or depression, active appease and psychological counseling were provided, with one-on-one communications scheduled every 2 days to release physical and mental stress, during which the impact of negative emotions on the heart was emphasized.

(2) Knowledge phase

Patients were stratified based on their educational level and learning comprehension abilities for reasonable education and interaction. For patients with strong learning comprehension abilities, they were arranged to

participate in group discussions, where real-life typical cases were used to emphasize the positive impact of medication adherence on heart failure control and the beneficial effects of healthy behaviors such as low-fat and salt-restricted diets on symptom control and prognosis improvement. For patients with poor learning comprehension abilities, activities such as simulated medication boxes and on-site calculation of sodium intake were used to enhance their awareness of diet and medication. Chronic heart failure rehabilitation knowledge, including heart failure warning signals, weight recording and management, and healthy behavior recording and management, was regularly pushed through WeChat mini-programs and WeChat groups, with 2–3 online Q&A sessions set up weekly to continuously reinforce patient memory.

(3) Belief phase

The Health Belief Model was utilized to help patients establish the belief that "healthy behaviors can improve prognosis and control the condition". For example, the progression process and speed of chronic heart failure were demonstrated on-site using heart models, and comparative analyses were conducted using healthy behavior heart failure progression models and unhealthy behavior heart failure progression models to fully inform patients and their families of the hazards of unhealthy behaviors. Personalized goals were set based on the patient's physical condition, such as losing 1 jin (0.5 kg) per week, and family members were asked to supervise the patient to help achieve this goal. Nurses conducted telephone follow-ups once a week, using open-ended questions for interviews to understand the resistance faced by the patient at this stage and resolve various obstacles to help the patient strictly adhere to each medical advice.

(4) Behavior phase

A behavior plan was formulated based on the patient's actual situation, such as a morning exercise plan for patients, starting with a 10-minute morning walk and gradually increasing to 30 minutes, during which heart rate was continuously monitored using a smart bracelet. A favorable home environment was created, and family members were jointly involved in cultivating a low-fat and salt-restricted dietary environment, with family members actively participating as health supervisors. Patients were required to create a chronic heart failure self-management diary, recording the time of writing and daily symptoms, medication, diet, and exercise. The diary was brought for review during monthly check-ups, and nurses read the diary, pointed out issues, and provided positive incentives to the patient.

Both groups received continuous nursing for 3 months.

2.3. Observation indicators

2.3.1. Cardiac function

Cardiac function was assessed using cardiac ultrasound, with a total of three indicators.

2.3.2. Quality of life

Quality of life was evaluated using the Minnesota Living with Heart Failure Questionnaire, which includes three dimensions: physical total score (0–40 points), social support total score (0–40 points), and emotional dimension (0–25 points). Lower scores indicate better quality of life [5].

2.4. Statistical methods

Data analysis was performed using SPSS 27.0.

After confirming normal distribution via the Shapiro-Wilk test, measurement data were expressed as mean ±

standard deviation ($\overline{x} \pm s$) and compared using *t*-tests. Count data were expressed as frequencies (percentages) and compared using χ^2 tests. A *p*-value < 0.05 was considered statistically significant.

3. Results

There was statistical significance ($p < 0.05$). There was no statistical significance ($p > 0.05$).

3.1. Comparison of cardiac function between the two groups

As shown in **Table 1**, after three months of nursing, the left ventricular ejection fraction (LVEF) in the observation group was significantly higher than that in the control group, while the left ventricular end-systolic diameter (LVESD) and left ventricular end-diastolic diameter (LVEDD) were significantly lower than those in the control group ($p < 0.05$).

Table 1. Cardiac function of the two groups ($\overline{x} \pm s$)

Group	Number of cases	LVEF (%)		LVESD (mm)		LVEDD (mm)	
		Before care	After 3 months of care	Before care	After 3 months of care	Before care	After 3 months of care
Observation group	56	32.12 ± 5.36	45.37 ± 5.99[a]	51.06 ± 5.24	40.02 ± 4.11[a]	59.79 ± 5.68	48.23 ± 4.07[a]
Control group	56	32.96 ± 5.51	40.01 ± 5.83[a]	50.34 ± 5.10	44.38 ± 4.38[a]	59.02 ± 5.53	53.07 ± 4.26[a]
t value	-	0.818	4.799	0.737	5.432	0.727	6.147
p value	-	0.415	< 0.001	0.463	< 0.001	0.469	< 0.001

Note: Compared with the same group before nursing intervention, [a]$p < 0.05$. LVEF refers to left ventricular ejection fraction, LVESD refers to left ventricular end-systolic diameter, and LVEDD refers to left ventricular end-diastolic diameter.

3.2. Comparison of quality of life between the two groups

As shown in **Table 2**, after three months of nursing care, the quality-of-life score in the observation group was significantly lower than that in the control group ($p < 0.05$).

Table 2. Quality of life in the two groups ($\overline{x} \pm s$)

Group	Number of Cases	Physical		Social support		Emotional	
		Before Care	3 Months After Care	Before Care	3 Months After Care	Before Care	3 Months After Care
Observation group	56	23.76 ± 3.48	13.02 ± 3.07	24.86 ± 3.87	12.16 ± 3.00	14.68 ± 2.67	8.02 ± 2.11
Control group	56	23.21 ± 3.35	17.63 ± 3.18	24.12 ± 3.75	16.54 ± 3.26	14.17 ± 2.52	10.45 ± 2.28
t value	-	0.852	7.805	1.028	7.398	1.040	5.854
p value	-	0.396	< 0.001	0.306	< 0.001	0.301	< 0.001

Note: Compared with the same group before nursing intervention, [a]$p < 0.05$.

4. Discussion

In this study, the improvement in cardiac function was more pronounced in the observation group compared to the control group. The underlying reason is that patients with chronic heart failure exhibit significant pathological changes in cardiac function, prompting clinical treatment and nursing care to focus closely on alterations in cardiac function. The key to enhancing cardiac function lies in the individualized intervention of nursing care on the pathophysiological processes [6]. Conventional nursing care tends to prioritize clinical treatment and in-hospital management, which, although effective in rapidly controlling the patient's condition and initiating early treatment, encounters substantial challenges in correcting information discrepancies and addressing psychological issues [7]. These aspects can profoundly impact the patient's healthy behavioral habits and disease symptom management [8]. In contrast, individualized nursing care based on the IKAP model facilitates progressive communication and personalized management, heightening the patient's awareness of the disease, treatment, medication, and behaviors, rectifying all actions that affect cardiac function, and creating a conducive environment for improving cardiac function, thus yielding remarkable results. In this study, the improvement in quality of life was also more significant in the observation group compared to the control group. The reason is that chronic heart failure typically has a prolonged course, severely affecting the patient's normal life [9]. However, conventional nursing care places greater emphasis on in-hospital care, with relatively infrequent follow-up visits outside the hospital, resulting in poor management outcomes and a slow recovery in quality of life [10]. In contrast, individualized nursing care based on the IKAP model, in addition to addressing the patient's cognitive and psychological issues, assists the patient in correcting unhealthy lifestyle habits and resuming normal life.

5. Conclusion

In summary, the implementation of individualized nursing care based on the IKAP model in patients with chronic heart failure leads to significant improvements in cardiac function and quality of life recovery, demonstrating remarkable application effects. However, this study has certain limitations, including a short observation period and a lack of indicators such as complications, which hinder a comprehensive analysis of the nursing value. Further in-depth clinical research is warranted.

Disclosure statement

The author declares no conflict of interest.

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