ORIGINAL RESEARCH

Evidence-Based Nursing Interventions in Care of Heart-failure Patients With Concurrent Tumors

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ABSTRACT

Context • In clinical practice, heart failure with concurrent tumors is relatively rare, and surgical intervention is the primary treatment. However, most patients have poor physical function and metabolic capacity, making them less tolerant of surgical trauma. Strengthening perioperative nursing care is therefore particularly important.

Objective • The study aimed to analyze the clinical effects of and patient satisfaction with evidence-based nursing interventions on perioperative conditions and quality of life for heart-failure patients with concurrent tumors, with the goal of identifying the optimal nursing model for these patients.

Design • The research team conducted a randomized, controlled clinical trial.

Setting • The study took place at the First People's Hospital of Lin'an District in Hangzhou City, Zhejiang Province, China.

Participants • Participants were 100 heart-failure patients with concurrent tumors who had been admitted to the hospital between July 2021 and July 2022.

Interventions • The research team divided participants into two groups based on their admission times with 50 participants in each group: (1) a control group, who received routine nursing care, and (2) an intervention group, who received an evidence-based nursing intervention.

Outcome Measures • The research team: (1) examined perioperative conditions, (2) measured changes in plasma levels of brain natriuretic peptide (BNP), (3) evaluated quality of life, and (4) assessed nursing satisfaction nursing satisfaction.

Results • No significant differences existed in the groups' demographic and clinical characteristics, indicating comparability. Compared to the control group, the intervention group's: (1) operation time (P = .021), ascending aorta occlusion time (P = .032), turnaround time of cardiopulmonary bypass (P = .040) were significantly shorter; (2) plasma BNP levels were significantly lower at postoperative days 3 (P = .036) and 7 (P = .022); (3) scores for quality of life—physiological (P = .007), emotional (P = .008), social (P = .013), and role (P = .011) function—were significantly higher; and (4) nursing satisfaction was significantly higher (P = .004).

Conclusions • The adoption of evidence-based nursing interventions in clinical settings, especially for heart-failure patients with concurrent tumors, can yield significant effects, improving patient outcomes and enhancing quality of life and nursing satisfaction. (*Altern Ther Health Med.* 2024;30(10):377-383).

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With the rapid development of Chinese society and economic improvements for its citizens, people's lifestyles have become faster-paced, and the pressure of life has increased. According to the 2021 report *Cardiovascular Health and Disease in China,* the number of patients with cardiovascular disease in China is continuously increasing, with approximately 330-million individuals affected, including around 8.9 million patients with heart failure.[1,2]

Heart failure refers to structural and functional changes in the myocardium that occur for various reasons, such as coronary artery disease, high blood pressure, and that can lead to impaired ventricular pumping or ventricular filling function.[3,4] Clinical manifestations mainly include dyspnea, pulmonary edema, and cardiogenic shock.

Most cases of heart failure originate from left ventricular failure, initially manifesting as pulmonary congestion. Heart failure can occur not only in the general population but also in patients with comorbid tumors.[5,6] The main causes of heart failure in cancer patients may be associated with pre-existing cardiovascular diseases or with the characteristics of the medications used during treatment.

In clinical practice, heart failure with concurrent tumors, particularly primary cardiac tumors, is relatively rare, with benign tumors being more common. The most frequent location is the left atrial appendage, and polypoid protrusion into the cardiac cavity characterizes the growth pattern.[7,8]

Surgical intervention is the primary treatment for heart failure with concurrent tumors, but most patients have poor physical function and metabolic capacity, making them less tolerant of surgical trauma, including having anesthesia stress responses. Therefore, strengthening perioperative nursing care is particularly important.[9]

Evidence-based Nursing

In traditional nursing models, healthcare providers primarily execute medical orders, lacking nursing initiative and underusing professional knowledge. The provided care lacks continuity, planning, and patient satisfaction.

Evidence-based nursing is an indispensable component of evidence-based medicine and represents a novel nursing approach in clinical practice. It involves a patient-centered care model that combines theory and experience, integrating them into nursing practice with organizational and continuous characteristics.[10,11] This type of nursing is an approach to healthcare where nurses make clinical decisions based on the best available, current research evidence; their clinical expertise; and the patients' preferences.

Evidence-based nursing: (1) involves integrating individual clinical skills with the most reliable, relevant scientific evidence to deliver optimal nursing care; (2) combines research findings, work experience, and individual preferences to optimize nursing practice; and (3) emphasizes the application of nursing concepts in relevant practices, considers patients' conditions, and implements holistic evidence-based care centered around the patient.[12-14]

Liu's study involving 120 participants found that an evidence-based nursing model could effectively improve perioperative conditions.[15] That study's intervention group, which received evidence-based nursing, had significantly better perioperative conditions, such as shorter operation times, than the control group did. Hornetvet, et al. found that the evidence-based nursing model could effectively improve perioperative conditions and reduce surgical time.[16]

Evidence-based Practices

Evidence-based nursing integrates current scientific evidence, expert consensus, and patients' preferences. The evidence comes from rigorous literature reviews and adherence to clinical guidelines. Research supports each intervention, including that from trials and analyses, and guidelines from recognized bodies summarize those findings.

Nurses remain informed by engaging in ongoing training and by consulting resources such as the Cochrane Library, PubMed, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) for current information. Some examples of practices include: (1) pressure ulcer prevention, (2) fall prevention, (3) pain management, (4) blood clot prevention, (5) early ambulation, (6) infection control, (7) breastfeeding support, and (8) dietary recommendations.

Pressure ulcer prevention. Nurses regularly reposition patients and use pressure-relief devices, following the pressure ulcer prevention in intensive care patients: guidelines and practice, which systematic reviews have confirmed to be effective.[17]

Fall prevention. Nurses use trainings regarding muscle strength and endurance of the ankles and the lower extremities, static balance, dynamic balance, following the findings of studies that highlight their roles in decreasing falls.[18]

Pain management. Nurses employ pain scales and prescribed medicines, together with alternative methods such as relaxation techniques, to reduce patients' pain, following the American Pain Society's guidelines.[19]

Blood clot prevention. For postsurgical patients, nurses use compression devices and anticoagulants[20] and the American College of Chest Physicians' guidelines have recommended.[21]

Early ambulation. Nurses encourage postsurgical movement to prevent complications that studies showing the benefits of movement have supported,[22] aligning with the Surgical Care Improvement Project's standards.[23]

Infection control. Nurses use practices such as proper handwashing and sterile techniques to prevent infections, which the Centers for Disease Control and Prevention's (CDC's) guidelines indicate[24] and which reflect comprehensive research findings.[25]

Breastfeeding support. Nurses offer lactation education, which the Baby-Friendly Hospital Initiative[26] and the World Health Organization (WHO)[27] have recommended and which research has found can promote health for mothers and infants.[28]

Dietary recommendations. Recommendations for recovery prioritize proteins for tissue repair, sufficient calories for energy, essential micronutrients to aid healing and immune function, hydration to support cellular processes, fiber to maintain digestive health, omega-3s to reduce inflammation, and frequent small meals to sustain nutrient intake. Nurses' adherence to these guidelines can enhance healing, minimize complications, and expedite patients' return to daily life.[29]

Current Study

However, research on the evidence-based nursing model is relatively limited in China. Therefore, the current study aimed to analyze the clinical effects of and patient satisfaction with evidence-based nursing interventions on perioperative conditions and quality of life for heart-failure patients with concurrent tumors, with the goal of identifying the optimal nursing model for these patients.

METHODS

Participants

The research team conducted a randomized, controlled clinical trial, which took place at the First People's Hospital of Lin'an District in Hangzhou City, Zhejiang Province, China. Potential participants were heart-failure patients who had been admitted to the hospital between July 2021 and July 2022.

The study included potential participants if they: (1) had received a clinical diagnosis of a cardiac tumor and had a heart-function grade of I-II, (2) were 18-55 years of age, and (3) had normal cognitive function and no communication barriers.

The study excluded potential participants if they: (1) were pregnant, (2) contraindications for the relevant surgeries were present, (3) had mental disorders or a family history of mental illnesses, or (4) had concurrent kidney or other related diseases.

The selection of participants initially included 150 heart-failure patients with concurrent tumors, but 20 patients refused to participate and 30 didn't meet the inclusion criteria.

The research team informed patients and their families of the research content, and they voluntarily signed the informed consent forms. The Medical Ethics Committee of the hospital approved the study's protocols, and the research team carried out the study in accordance with the Declaration of Helsinki. (Trial registration number: NCT01895742.)

Procedures

Sample size. The research team based the sample size of 100 participants on multiple factors. Statistical calculations ensured that the study included enough participants to detect true differences, with significance usually set at $P < .05$ and power at 80-90%. The team also considered practical factors, such as time, budget, and participants' availability.

The chosen sample size aligned with prior research and pilot data that informed estimates of variability and effect size. The sample size was large enough to be clinically meaningful yet small enough for ethical and resource efficiency.

Interventions. The research team used simple randomization to allocate participants to the treatment groups. Each participant was assigned a random number using a computer-generated randomization algorithm. The randomization sequence was generated by an independent statistician who was not involved in participant recruitment or data collection. Participants were enrolled sequentially, and their group assignment was determined based on the randomization sequence. Allocation was performed by the research coordinator, who had access to the randomization sequence and assigned participants accordingly. (1) a control group, who received routine nursing care, and (2) an intervention group, who received an evidence-based nursing care.

Data collection. The research team collected data on participants' demographic and clinical characteristics, including gender, age, height, body mass index (BMI), education level, disease duration, pathological classification, and tumor type. No participants had immune dysfunctions. After randomization, the baseline characteristics of participants in both groups were compared to assess the balance achieved through random allocation. Additionally, blinding procedures were implemented to maintain the integrity of the study. Participants, researchers, and outcome assessors were blinded to group assignments, minimizing potential biases in data collection and analysis.

Outcome measures. The research team: (1) examined perioperative conditions, (2) measured changes in plasma levels of brain natriuretic peptide (BNP), (3) evaluated quality of life using the Pediatric Quality of Life Inventory 4.0 (PedsQL 4.0),[30] and (4) assessed nursing satisfaction.

Interventions

Control group. The control group received routine nursing care, which primarily included monitoring vital signs, providing preoperative health education, and offering postoperative guidance on diet and prevention of related complications.

Intervention group. The intervention group received evidence-based nursing care, with the following nursing interventions: (1) establishment of an evidence-based nursing team, (2) identification of relevant evidence-based questions, (3) establishment of evidence-based support, (4) implementation of evidence-based nursing, (5) provision of psychological care. (6) provision of dietary care, and (7) provision of early cardiac care.

Establishment of evidence-based nursing team. The team leader was the head nurse, and the team members consisted of charge nurses and responsible nurses. The team members received training in evidence-based nursing skills, conducted discussions about their implementation, and formulated effective nursing plans. Each team member was responsible for specific aspects of nursing based on his or her strengths.

Identification of relevant evidence-based questions. Based on the characteristics of heart failure with concurrent tumors, the nursing team identified relevant nursing problems with significant impact on patients through reviewing the literature and medical records and analyzing the patients' psychological characteristics and clinical symptoms. The team formulated evidence-based questions based on negative emotions, such as fear and anxiety, that patients experienced. The team searched the relevant literature through multiple channels and combined with clinical manifestations, clarified and derived the evidence-based questions specific to the patients.

Establishment of evidence-based support. The nursing team extracted relevant information from databases, such as the China National Knowledge Infrastructure (CNKI), Wanfang, and PubMed. Using evidence-based criteria for grading, the nursing staff strengthened the analysis of the relevant problems. By combining literature retrieval with clinical experience, the nursing team conducted a systematic evaluation of the literature to identify optimal nursing support.

Implementation of evidence-based nursing. The nursing team focused on creating a comfortable and restful environment for patients, ensuring regular ventilation and disinfection of the ward, providing timely assistance to patients, promoting nurse-patient relationships, and providing high-quality nursing care and atmosphere for patients. The nursing staff closely monitored patients' vital signs, such as respiration and cardiac function.

Provision of psychological care. After a patient regained consciousness, the nursing staff actively engaged in communication with him or her, explained the causes of and treatment plans for heart failure in detail to the patient and his or her family members, and increased the patient's confidence in treatment. The staff used music therapy, meditation, and relaxation breathing techniques to assist patients in achieving physical and mental relaxation.

Provision of dietary care. Based on a patient's condition, the nursing staff developed a reasonable nutritional plan to ensure a balanced diet, and they advised patients to avoid smoking and alcohol consumption.

Provision of early cardiac care. The nursing staff assessed a patient's condition and formulated corresponding nursing measures based on the patient's heart-failure grade. The staff provided regular massage and joint exercises to patients who were bedridden.

Outcome Measures

Perioperative conditions. The research team compared the perioperative conditions of the groups, including operation time, ascending aorta occlusion time, and turnaround time of cardiopulmonary bypass.

Plasma levels of BNP. BNP is a neurohormone that ventricular myocardial cells synthesize. Its levels increase in the presence of myocardial injury, ventricular overload, and increased wall pressure. The level of BNP is directly proportional to cardiac function, making it a direct reflection of a patient's cardiac status.[15-17]

Crawford et al and Fiset et al found that evidence-based nursing, centered around the patient and based on nursing measures, could mobilize the enthusiasm of nursing team members to provide scientific and humanistic care, which can help inhibit BNP secretion.[18,19]

The research team compared the groups' changes in levels at three time points: one day before surgery, 3 days after surgery, and 7 days after surgery. The team collected 3 mL of blood from patients in the morning each day and measured the plasma concentration of BNP using the using a commercially available immunoflurometric assay (Triage BNP, Biosite Diagnostics, San Diego, California). The normal range for brain natriuretic peptide is 0-100 pg/mL.

Quality of life. Several studies have found that evidence-based nursing can effectively improve patients' quality of life and satisfaction with nursing care.[21-23] The research team used the PedsQL 4.0 at 24 hours postoperatively to evaluate patients' quality of life.[30]

The PedsQL 4.0 scale is a versatile questionnaire administered to children and adolescents or their parents to gauge health-related quality of life across the subdomains physical function, emotional function, social function, and role function. Each domain's score ranges from 0 to 100, with higher scores indicating better quality of life.

The scale aids in evaluating treatment effectiveness, monitoring disease progression, customizing patients' care, and informing healthcare policy. Clinically, variations in the PedsQL scores can indicate changes in a patient's condition or quality of life, with significance determined by the minimum difference that patients perceive as beneficial.

Nursing satisfaction. The research team assessed nursing satisfaction using the hospital's self-developed questionnaire, which includes three categories: highly satisfied, moderately satisfied, and dissatisfied. The team calculated the satisfaction rate as the sum of the highly satisfied and moderately satisfied rates.

Table 1. Participants' Demographic and Clinical Characteristics at Baseline (n = 100)

Characteristics		Control Group n = 50 n (%) Mean ± SD	Observation Group n = 50 n (%) Mean ± SD	t/χ^2 value	*P* value
Gender	Male	34 (68.00)	33 (66.00)	0.497	1.012
	Female	16 (32.00)	17 (34.00)		
Age, y	Range	18-53	19-55	0.964	1.687
	Mean	36.29 ± 1.44	36.88 ± 1.21		
Height, cm	Range	158-169	159-170	1.353	.492
	Mean	163.74 ± 0.85	164.25 ± 0.72		
BMI, kg/m^2	Range	20-28	20-29	0.987	1.641
	Mean	23.69 ± 1.95	24.14 ± 1.37		
Education Level	Primary school	10 (20.00)	14 (28.00)	5.098	.080
	High school	32 (64.00)	30 (60.00)		
	College or above	8 (16.00)	6 (12.00)		
Disease Duration, y	Range	0-10	0-10	0.478	1.094
	Mean	5.21 ± 0.36	5.33 ± 0.31		
Pathological Classification	Class I	26 (52.00)	28 (56.00)	8.091	.621
	Class II	24 (48.00)	22 (44.00)		
Tumor Type	Primary	13 (26.00)	11 (22.00)	10.908	.871
	Secondary	37 (74.00)	39 (78.00)		

Abbreviations: BMI, body mass index.

RESULTS

Participants

The research team included and analyzed the data of 100 participants, 50 in each group (Table 1). The control group included 34 males (68.00%) and 16 females (32.00%), with an age range from 18 to 53 years and a mean age of 36.29 ± 1.44 years. The group's height ranged from 158 to 169 cm, with a mean of 163.74 ± 0.85 cm, and its BMI ranged from 20 to 28 kg/m^2, with a mean of 23.69 ± 1.95 kg/m^2. The group included 10 participants (20.00%) with a primary school education, 32 (64.00) with a high school education, and 8 (16.00) with a college education. The duration of illness ranged from 0 to 10 years, with a mean of 5.21 ± 0.36 years. The pathological classifications included 26 participants in class I (52.00%) and 24 in class II (48.00%). The tumor types included 13 participants with primary tumors (26.00%) and 37 with secondary tumors (74.00%).

The intervention group included 33 males (66.00%) and 17 females (34.00%). The age ranged from 19 to 55 years, with a mean age of 36.88 ± 1.21 years. The group's height ranged from 159 to 170 cm, with a mean of 164.25 ± 0.72 cm, and its BMI ranged from 20 to 29 kg/m2, with a mean of 24.14 ± 1.37 kg/m^2. The group included 14 (28.00) with a primary school education, 30 (60.00) with a high school education, and 6 (12.00) with a college education.The duration of illness ranged from 0 to 10 years, with a mean of 5.33 ± 0.31 years. The pathological classifications included 28 participants in class I (56.00%) and 22 in class II (44.00%). The tumor types included 11 participants with primary tumors (22.00%) and 39 with secondary tumors (78.00%).

No significant differences existed in characteristics between the groups at baseline ($P > .05$).

Perioperative Conditions

The control group's mean operation time was 4.10 ± 0.35 h, mean ascending aorta occlusion time was 1.27 ± 0.21 h, and

Table 2. Comparison of Perioperative Conditions Between the Intervention and Control Groups (n = 100)

Group	Operation Time, h Mean ± SD	Ascending Aorta Occlusion Time, h Mean ± SD	Turnaround Time of Cardiopulmonary Bypass, h Mean ± SD
Control group, n = 50	4.10 ± 0.35	1.27 ± 0.21	1.76 ± 0.26
Intervention group, n = 50	3.41 ± 0.23	0.99 ± 0.13	1.57 ± 0.18
t value	2.461	1.247	1.066
P value	.021[a]	.032[a]	.040[a]

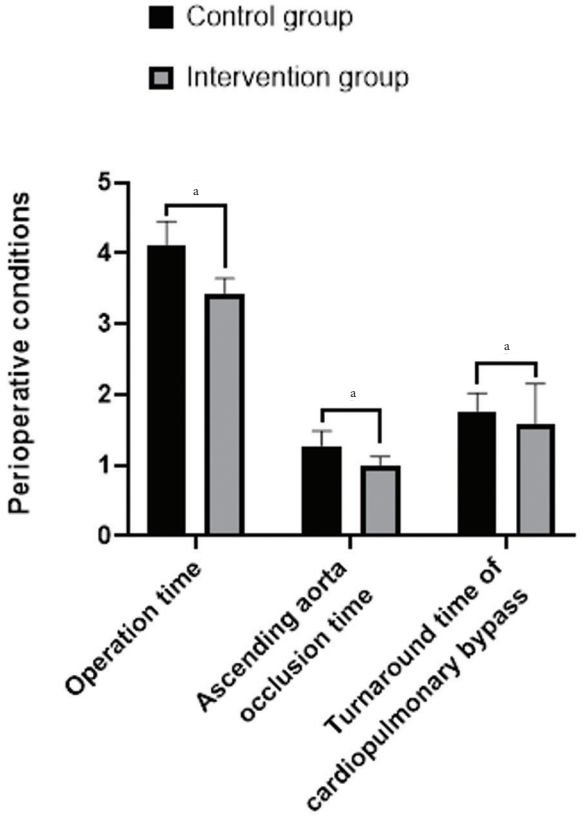
*$P < .05$, indicating that the intervention group's operation time, ascending aorta occlusion time, and turnaround time of cardiopulmonary bypass were significantly shorter than those of the control group

Table 3. Comparison of Changes in Plasma Brain Natriuretic Peptides in Intervention and Control Groups (n = 100)

Group	Day 1 Pre-operatively Mean ± SD	Day 3 Postoperatively Mean ± SD	Day 7 Postoperatively Mean ± SD
Control group, n = 50	59.42 ± 5.11	151.34 ± 13.58	112.83 ± 12.16
Intervention group, n = 50	58.96 ± 4.89	98.56 ± 12.49	79.75 ± 11.49
t value	1.496	4.254	15.364
P value	.537	.036[a]	.022[a]

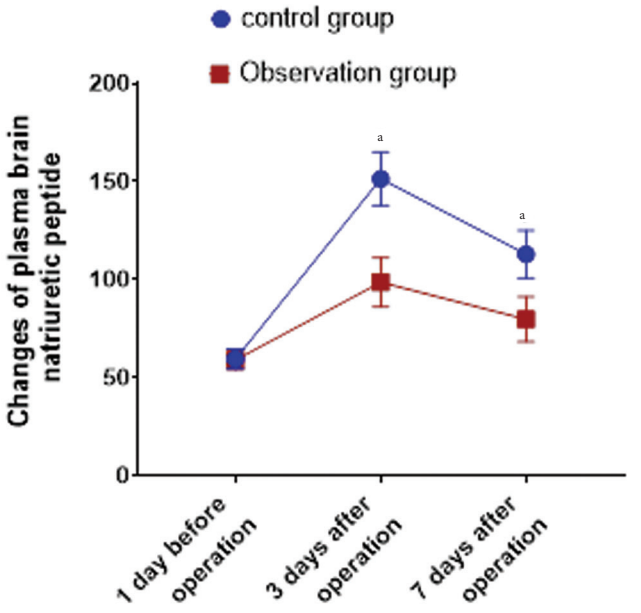
[a]$P < .05$, indicating that the intervention group's levels of plasma brain natriuretic peptide at 3 and 7 days postoperatively were significantly lower than those of the control group

Figure 1. Comparison of Perioperative Conditions Between the Intervention and Control Groups (n = 100)



[a]$P < .05$, indicating that the intervention group's operation time, ascending aorta occlusion time, and turnaround time of cardiopulmonary bypass were significantly shorter than those of the control group

Figure 2. Comparison of Changes in Plasma Brain Natriuretic Peptide (BNP) Between the Intervention and Control Groups (n = 100)



[a]$P < .05$, indicating that the intervention group's levels of BNP at 3 and 7 days postoperatively were significantly lower than those of the control group

mean turnaround time of cardiopulmonary bypass was 1.76 ± 0.26 h (Table 2 and Figure 1). The interventions group's mean operation time was 3.41 ± 0.23 h, mean ascending aorta occlusion time was 0.99 ± 0.13 h, and mean turnaround time of cardiopulmonary bypass was 1.57 ± 0.18 h.

The intervention group's mean operation time ($P = .021$), aorta occlusion time ($P = .032$), and turnaround time of cardiopulmonary bypass ($P = .040$) were significantly shorter than those of the control group.

Plasma Levels of BNP

Table 3 and Figure 2 show that no significant difference existed between the groups in the BNP levels on the day before surgery ($P > .05$). The control group's mean BNP was 151.34 ± 13.58 on postoperative day 3 and 112.83 ± 12.16 on postoperative day 7. The intervention group's mean BNP was 98.56 ± 12.49 on postoperative day 3 and 79.75 ± 11.49 on postoperative day 7.

The intervention group's plasma BNP levels were significantly lower on postoperative days 3 ($P = .036$) and 7 ($P = .022$) than those in the control group.

Quality of Life

At 24 hours postoperatively, the control group's mean score for physiological function was 83.54 ± 9.26, for emotional function was 85.34 ± 8.11, for social function was 70.51 ± 8.29, and for role function was 68.47 ± 7.44 (Table 4). The intervention group's mean score for physiological function was 91.87 ± 9.80, for emotional function was 92.64 ± 8.24, for social function was 89.24 ± 8.30, and for role function was 85.86 ± 7.67.

The intervention group's scores for physiological ($P = .007$), emotional ($P = .008$), social ($P = .013$), and role ($P =$

Table 4. Comparison of Scores on the PedsQL4.0 Scale at 24 hours Postoperatively Between the Intervention and Control Groups (n = 100)

group	Physiological Function Mean ± SD	Emotional Function Mean ± SD	Social Function Mean ± SD	Role Function Mean ± SD
Control group, n = 50	83.54 ± 9.26	85.34 ± 8.11	70.51 ± 8.29	68.47 ± 7.44
Intervention group, n = 50	91.87 ± 9.80	92.64 ± 8.24	89.24 ± 8.30	85.86 ± 7.67
t value	21.694	19.587	15.321	14.557
P value	.007	.008	.013	.011

Abbreviations: PedsQL4.0, Pediatric Quality of Life Inventory.

Table 5. Participants' Nursing Satisfaction Postintervention (n = 100)

Group	Very Satisfied n (%)	Generally Satisfied n (%)	Dissatisfied n (%)	Total Satisfaction n (%)
Control group, n = 50	28 (56.00)	13 (26.00)	9 (18.00)	41 (82.00)
Intervention group, n = 50	36 (72.00)	12 (24.00)	2 (4.00)	48 (96.00)
χ^2 Value				3.247
P value				.004

.011) function were significantly higher than those of the control group at 24 hours postoperatively.

Nursing Satisfaction

Table 5 shows that postintervention in the control group, 28 participants were very satisfied (56.00%), 13 were generally satisfied (26.00%), and 9 were dissatisfied (18.00%). In the intervention group postintervention, 36 participants were very satisfied (72.00%), 12 were generally satisfied (24.00%), and 2 were dissatisfied (4.00%).

The intervention group's total satisfaction rate was 96.00%, including 48 participants, as opposed to that of the control group at 82.00%, including 41 participants, and the intervention group's rate was significantly higher than that of the control group ($P = .004$).

DISCUSSION

The current study found that no significant difference existed between the groups in the plasma BNP values at one day before surgery. However, the intervention group's levels were significantly lower than those of the control group at 3 and 7 days after surgery. This indicates that the current study's evidence-based nursing model can effectively reduce patients' plasma BNP levels. Also, consistent with the results of Hornetvet, et al.'s study,[16] the current study found that patients receiving evidence-based nursing had significantly higher scores for quality of life than the control group did.

The evidence-based nursing team developed targeted nursing plans through discussions and consideration of each patient's individual circumstances. Nursing staff established trust through communication and built a comfortable ward environment, paying attention to patients' internal states and providing timely psychological counseling to ensure patients' physical and mental well-being. As several studies previously found,[31-33] this effectively improved patients' quality of life and satisfaction with nursing care. The intervention group's satisfaction rate, at 96.00%, was significantly higher than that of the control group, at 82.00%.

Implementing evidence-based nursing interventions for heart-failure patients with tumors can improve outcomes, streamline surgical processes, and enhance perioperative safety. Such interventions can lead to better cardiac function, as evidenced by intervention group's significantly lower BNP levels and higher patient satisfaction in the current study, due to more personalized care. These approaches also promote care standardization, contributing to equitable treatment across clinical settings. Moreover, evidence-based nursing fosters professional growth among nurses and can be cost-effective by lowering complication rates and hospital stays. Ultimately, this strategy enriches patient recovery and well-being, forming the basis of superior nursing care and should be a focal point in healthcare policy and training.

Acknowledging a study's limitations, such as small or nonrandom samples, design flaws, and potential biases, is crucial for the credibility and applicability of its findings. The current study indicates the potential of evidence-based nursing for heart failure with concurrent tumors but had some limitations, such as a small sample size, a potential for selection bias, a single-center design, absence of blinding, a reliance on subjective measures, a short follow-up duration, uncontrolled confounding variables. The current research team must acknowledge the study's limitations, including its scope and sample diversity, as they may influence the applicability of the results. These factors necessitate careful interpretation of results and suggest areas for methodological improvements in future research.

Future research to enhance the understanding of evidence-based nursing for heart-failure patients with concurrent tumors should include: (1) multicenter studies with larger, more diverse samples than in the current study for broader applicability, (2) longitudinal and randomized controlled trials for long-term effects and causality, and (3) blinded methodologies to reduce bias. It should also combine subjective and objective outcomes, assess cost-effectiveness, compare various nursing interventions, incorporate patients' feedback, explore technological enhancements, and examine the educational and implementation processes for evidence-based practices.

In summarizing the key elements for the discussion on heart failure with concurrent tumors, it's crucial to analyze the results in relationship to existing research, elucidating the relationship between the two conditions. Researchers should interpret the findings to reveal potential interactions and impacts, compare data with that of prior studies to assess alignment or discrepancies, and investigate for underlying mechanisms that might link heart failure to tumor dynamics. The clinical implications of these findings are essential for guiding future diagnostic and treatment strategies for affected patients.

CONCLUSIONS

The adoption of evidence-based nursing interventions in clinical settings, especially for heart-failure patients with concurrent tumors, can yield significant effects, improving patient outcomes and enhancing quality of life and nursing satisfaction.

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