Original Article
Evidence-based nursing in postoperative chemotherapy patients with breast cancer can reduce the incidence of adverse reactions

Li Yu*, Ping Wang*, Shaolei Wang, Feifei Yu

Central Ward Operating Room, Yantai Yuhuangding Hospital, Yantai, China. *Equal contributors and co-first authors.

Abstract: Objective: To explore whether evidence-based nursing reduces the incidence of chemotherapy-related adverse reactions during postoperative treatment in breast cancer and improves patients' quality of life. Methods: We included 110 patients with breast cancer who received postoperative chemotherapy in our hospital and randomly divided them into control and observation groups according to a random number table. Conventional nursing was adopted in the control group, and evidence-based nursing was provided in the observation group. The incidence of adverse reactions after chemotherapy, quality of life, length of in-hospital stays, SAS and SDS scores, and nursing satisfaction between the two groups were compared. Results: After nursing, the adverse reactions, length of in-hospital stays, and the SAS and SDS scores were lower in the observation group than they were in the control group, while the quality of life and nursing satisfaction were significantly higher than they were in the control group (all P<0.05). Conclusion: Evidence-based nursing in postoperative chemotherapy patients with breast cancer can reduce the incidence of adverse reactions and the length of in-hospital stays, improve patients' quality of life and moods, so evidence-based nursing exhibits a high clinical application value in the clinic.

Keywords: Evidence-based nursing, breast cancer, chemotherapy, adverse reactions, quality of life

Introduction

Statistics show that the incidence of breast cancer in China is gradually increasing, especially among young people [1, 2]. While treatable, metastatic breast cancer (MBC) cannot be cured [3]. The most common treatment for breast cancer is surgical resection combined with chemotherapy. Surgical resection can eliminate the niduses in the breasts and chemotherapy can prevent metastasis and the recurrence of breast cancer [4-6]. Although postoperative chemotherapy has a strong therapeutic effect, it will also bring more side effects. Patients will experience anxiety, and negative emotions and cannot cooperate with treatment [7-9]. Therefore, in order to improve patients' quality of life during postoperative treatment as well as the treatment effect, different nursing measures can be taken. Postoperative nursing can reduce the patients' pain to a certain extent and improve the postoperative mood and state of the patient, thus making

the patient accept the treatment in her best condition. It is found that the conventional nursing has little effect on patients with postoperative chemotherapy and cannot achieve the intended goals. Therefore, more effective nursing modes have attracted attention [10, 11].

Evidence-based nursing is an emerging nursing method. This nursing method refers to formulating a personalized nursing plan through the combination of clinical experience, theoretical knowledge, and specific patient conditions. It is reported that evidence-based nursing in patients with gynecologic malignancies can provide effective systemic nursing for patients, reduce multiple adverse reactions caused by chemotherapy, reduce the occurrence of complications, and improve patients' moods [12, 13]. Evidence-based nursing shows a better clinical nursing effect, and the effects are determined by nurses. Nurses are in contact with patients with breast cancer at all stages of

the disease and treatment. They play an important role in meeting the needs of these women. The ways of improving nursing practice at the different stages of the illness, from the pre-treatment phase to post-treatment follow-up assessment are crucial for the patients' quality of life [14]. An evidence-based specialist breast care nurse (SBN) model of care was investigated in a study [15], and interventions by BCNs aim to support women and help them cope with the impact of the disease on their quality of life. There is evidence that some aspects of care were improved by the SBN [16]. However, these studies focused on the management of psychological distress for women with breast cancer, yet they did not explore the factors such as adverse reactions. Therefore, this study aims to explore whether evidence-based nursing reduces the incidence of postoperative chemotherapy adverse reactions in breast cancer and improves patients' quality of life.

Materials and methods

General information

110 patients with breast cancer who underwent postoperative chemotherapy in our hospital were divided into two groups according to a random number table, with 55 cases in the control group, and another 55 cases in the observation group. There were no significant differences in the general clinical data, such as age and condition, between the two groups. All the patients were informed of the clinical protocol before the trial and signed informed consents. This study was approved by the Yantai Yuhuangding Hospital ethics committee.

Inclusion criteria: patients who were undergoing chemotherapy; patients who did not receive nursing care; patients whose vital organs such as the heart, liver and kidneys were not seriously damaged.

Exclusion criteria: patients with chemotherapy contraindications, such as liver dysfunction or severe cardiovascular disease, anemia, nutritional disorders, or low levels of plasma proteins; patients in the first trimester of pregnancy, unless the pregnancy should be interrupted; patients with a central nervous system disease, patients in a coma; patients with infections, fever, or a water, electrolyte, or acid-based balance disorder; patients with poor compliance; and patients who were unable to care for themselves were excluded.

Methods

The chemotherapy regimen of the two groups of patients after breast cancer was cyclophosphamide (75 mg/m^2), epirubicin (60 mg/m^2), and fluorouracil (500 mg/m^2).

The control group received conventional nursing, including psychological care, health education, drainage tube maintenance, and complication care.

The observation group received evidence-based nursing in addition to conventional nursing. Continuity of care is enhanced by a specialized team, since they coordinate women's progress through the treatment process. The specialized nursing program is as follows. Timely communication: patients were informed of the adverse reactions that may occur after chemotherapy. The nursing staff should actively communicate with the patient's family members to reduce negative emotions and improve the patient's self-confidence. Nutritional support: a reasonable diet with high-calorie, high-protein and digestible foods should be established, and at the same time, fresh fruits during meals, and vitamin supplements were provided. Respiratory tract care: during the postoperative chemotherapy, the patient should be instructed to take a deep breath and cough up sputum to ensure the normal function of the respiratory tract. Rehabilitation care: a rigorous rehabilitation plan was developed, and the physical function of the patients' limbs was restored by exercising. Cardiovascular medication care: in order to reduce the occurrence of injury, the blood vessels are flushed with normal saline before and after the injection of chemotherapy drugs. Gastrointestinal reaction care: patients often experience nausea and vomiting during chemotherapy, so they can take antiemetics before chemotherapy. The diet during chemotherapy should be light, and patients' attention to chemotherapy should be distracted [17]. The patients in both groups underwent different nursing interventions from the beginning of chemotherapy, which lasted for 6 weeks, and then each patient's various evaluation indicators were recorded (**Figure 1**).

Outcome measures and efficacy evaluation

Quality of life assessment: the Short Form 36 Health Survey (SF-36) was used to assess the patients' quality of life, including physiological
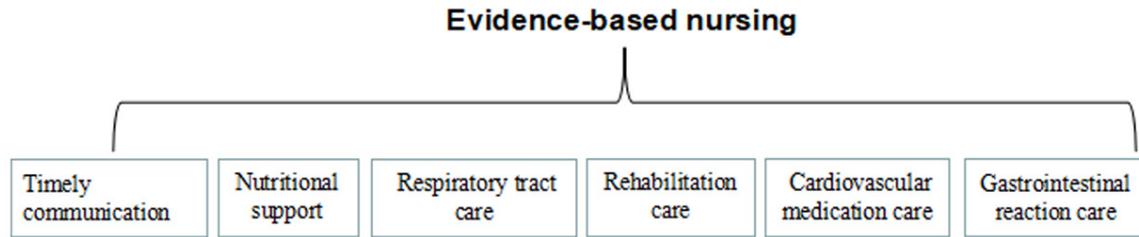
Evidence-based nursing

| Timely communication | Nutritional support | Respiratory tract care | Rehabilitation care | Cardiovascular medication care | Gastrointestinal reaction care |

Figure 1. Evidence-based nursing treatment method.

Table 1. Comparison of the general clinical data

groups	Cases (n)	Age (year)	TNM (n)				Concomitant diseases (n)	
			I	II	III	IV	diabetes	hypertension
Control group	55	42.45±5.09	15	19	12	7	8	10
Experimental group	55	41.99±4.87	11	20	14	9	9	11
t/X^2		0.460	1.081	0.003	0.117	0.213	0.070	0.059
P		0.632	0.313	0.956	0.732	0.644	0.792	0.808

functions, physiological roles, physical pain, general health, vitalities, social functions, mental health, and emotional functions. The total score for each function is 100, and the higher the score is, the higher the quality of life is [18].

Emotional assessment: Zung's Self-Rating Anxiety Scale (SAS) and Zung's Self-Rating Depression Scale (SDS) were used to evaluate each patient's mood. Each scale included 20 items, and the total score for each item is 4. The higher the score is, the more severe the patient's anxiety (depression) is [19].

The length of the in-hospital stays during chemotherapy was recorded.

Nursing satisfaction: a survey was conducted on patients about their nursing satisfaction, and the questionnaire contents were based on the "Clinical Nursing Service Codes and Standards", which includes the assessments on professional levels, doctor-patient relationship, job responsibilities, health education, service attitudes, and specialist skills. The total score is 100. A score <60 means the patients feel unsatisfactory, 60< score <80 means the patients feel satisfactory, and if the score is greater than 80, it means the patients feel very good. Satisfaction rate = (satisfactory cases + very good cases)/total cases [20].

The incidence of adverse reactions: the adverse reactions that occurred during the postoperative chemotherapy were recorded, including phlebitis, gastrointestinal reactions, pain, dyspnea, fatigue, and alopecia [21].

Statistical methods

The statistical analysis was performed using SPSS 20.0 software. The measurement data were expressed as the means ± standard deviations (mean ± SD), and independent t tests were used for the comparisons between groups. For the intragroup before-after comparisons, pairwise t tests were used. The count data was expressed as a percentage (%), and the X^2 test was adopted. P<0.05 indicated a difference was statistically significant.

Results

Comparison of the general clinical data

There were no significant differences in terms of age, TNM stage, etc. between the two groups, which were comparable (P>0.05) (**Table 1**).

Comparison of the incidences of adverse reactions

The number of patients who had adverse reactions in the observation group was significantly less than in the control group (**Table 2**).

Comparison of the quality of life

There were no significant differences in the physiological functions, physiological roles, physical pains, general health, vitalities, social

Table 2. Comparison of the adverse reactions

Adverse reactions	Control group (n, %)	Experimental group (n, %)	X^2	P
Phlebitis	37 (67.3)	16 (29.1)	18.538	0.000
Gastrointestinal reaction	42 (76.4)	18 (32.7)	23.654	0.000
pain	26 (47.3)	10 (18.2)	11.578	0.001
dyspnea	10 (18.2)	1 (1.8)	8.577	0.003
fatigue	24 (43.6)	13 (23.6)	5.615	0.018
alopecia	16 (29.1)	5 (9.1)	7.670	0.006

Table 3. Comparison of the quality of life (score, mean ± SD)

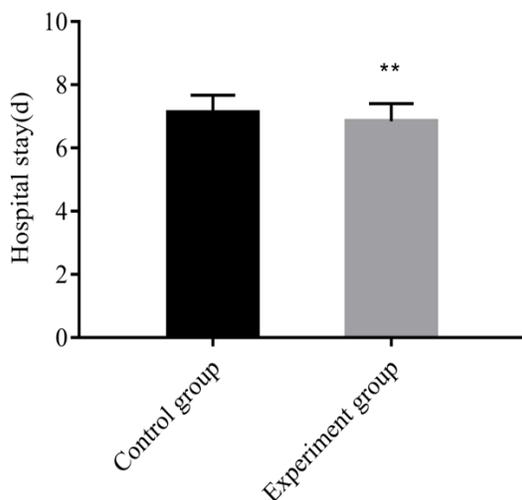| Index	Time	Control group	Experimental group	t	P
Physical function	Before treatment	78.93±8.09	79.09±8.86	-0.099	0.921
	After treatment	81.09±8.44	90.54±9.54	-5.502	0.000
Physical role limitations	Before treatment	59.34±6.32	60.43±6.78	-0.872	0.385
	After treatment	64.54±6.76	79.54±8.54	-10.214	0.000
Somatic pain	Before treatment	84.21±8.85	84.32±8.76	-0.066	0.948
	After treatment	76.65±7.98	82.34±8.38	-3.467	0.000
Overall health	Before treatment	61.25±6.65	60.79±6.76	0.360	0.720
	After treatment	60.98±7.09	65.43±6.74	-3.374	0.001
Energy	Before treatment	62.34±6.77	63.01±6.56	-0.527	0.599
	After treatment	57.43±6.45	66.45±6.98	-7.039	0.000
Social function	Before treatment	71.25±7.34	70.37±7.45	0.624	0.534
	After treatment	70.76±6.98	75.43±7.76	-3.318	0.001
Emotional role function	Before treatment	59.54±6.43	58.65±6.45	0.725	0.470
	After treatment	58.54±6.09	67.65±7.65	-6.910	0.000
Mental health	Before treatment	62.37±6.35	61.78±6.98	0.464	0.644
	After treatment	63.09±6.54	66.98±7.54	-2.890	0.005

Figure 2. Comparison of the length of in-hospital stays between the two groups. The hospital stay time in the experimental group (n=55) was significantly shorter than it was in the control group (n=55). **, P<0.01 compared with the control group.

functions, emotional functions, and mental health of the control group and the observation group before treatment (all P>0.05). After the treatment, the quality of life in the observation group was significantly higher than it was in the control group (**Table 3**).

Comparison of the length of in-hospital stays

The length of in-hospital stay of the observation group was significantly lower than that of the control group (P=0.009) (**Figure 2**).

Comparison of emotional changes before and after treatment

There were no significant differences in the SAS and SDS scores between the two groups before the treatment. After the treatment, the SAS and SDS scores in the observation group were significantly lower than they were in the control group (all P=0.000) (**Figures 3** and **4**).
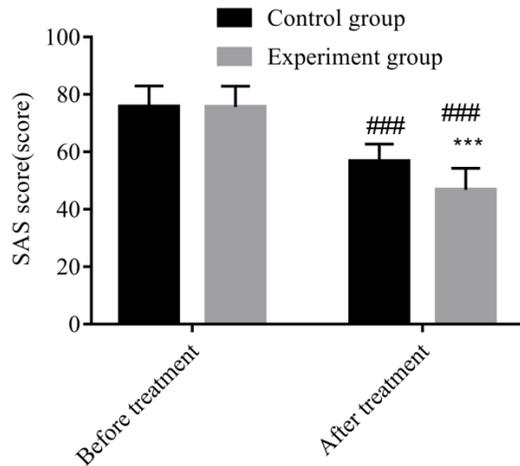
Figure 3. Comparison of the SAS scores in two groups. The SAS scores were measured using a self-rating anxiety scale. The SAS scores in the experimental group (n=55) were significantly higher than they were in the control group (n=55). ***, P<0.001 compared with the control group; ###indicated intra-group comparison, P<0.001.
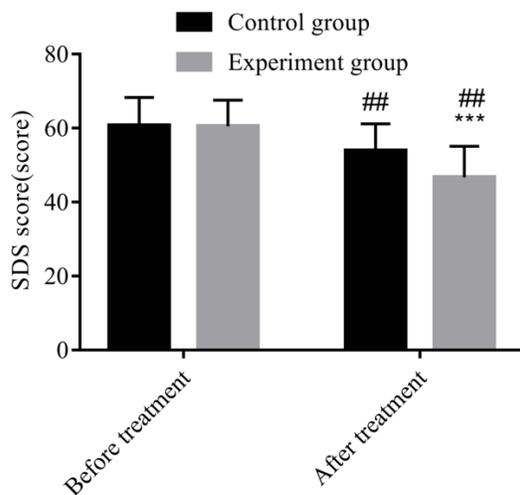

Figure 4. Comparison of the SDS scores in the two groups. The SDS scores were measured using the Self-Rating Depression Scale. The SDS scores in the experimental group (n=55) were significantly higher than they were in the control group (n=55). ***, P<0.001 compared with the control group; ##indicated intra-group comparison, P<0.001.

Comparison of the nursing satisfaction between the two groups of patients

The patients in the observation group who received evidence-based nursing had higher nursing satisfaction compared with the control group (P=0.000) (**Table 4**).

Discussion

Breast cancer is the most common female malignant tumor, and its incidence is increasing yearly. If it's not diagnosed and treated in a timely manner, it can metastasize and place a heavy burden on the patient's life and work [18]. Therefore, the treatment of breast cancer has become an important issue in the clinic. At present, the main clinical treatments are radical resection combined with chemotherapy. Surgery can remove the niduses containing the tumor cells, and chemotherapy can effectively control the spread of cancer cells [19-21]. However, after surgery and one cycle of chemotherapy, the patients may feel uncomfortable and are prone to be anxious and depressed, feelings which affect treatment compliance [22]. In order to improve the quality of life in patients during postoperative chemotherapy, more reasonable nursing methods should be adopted. At present, evidence-based nursing is gradually applied to postoperative chemotherapy as an emerging nursing method [23, 24], but there are few nursing studies on postoperative chemotherapy for breast cancer. In order to provide more nursing methods for such patients, this study selected patients with breast cancer who underwent postoperative chemotherapy and provided them with conventional nursing and evidence-based nursing respectively. The study found that evidence-based nursing could avoid adverse reactions, improve quality of life, shorten hospital stays, improve nursing satisfaction, and improve adverse emotions, so it has a better nursing effect. The clinical result of this study indicates that evidence-based nursing can be used as an effective nursing method for postoperative chemotherapy patients with breast cancer.

Evidence-based nursing is based on a patient's condition. It refers to making a personalized nursing rehabilitation program for patients, meeting the various treatment needs of patients as much as possible, so as to improve the nursing satisfaction. In recent years, evidence-based nursing has been widely used in the nursing field. The relationship between nurses and patients can be transformed into an ideal coordination mode by applying evidence-based nursing to postoperative chemotherapy patients with breast cancer, which means the medical staff actively communi-

Table 4. Comparison of nursing satisfaction [n (%)]

Groups	Cases (n)	Satisfaction (n)	General (n)	Not satisfied (n)	Total satisfaction
Control group	55	14	23	18	37 (67.27)
Experimental group	55	29	23	3	52 (94.54)
X^2			10.83		13.242
P			0.001		0.000

cates with the patients, the adverse reactions and emotions of the patients are greatly minimized, the quality of life is improved, and the expected nursing satisfaction is achieved [25-27].

Postoperative chemotherapy for breast cancer patients lasts a long time. During this period, patients not only have to suffer from physical harm, but they also bear the severe pain caused by chemotherapy. They endure many adverse reactions, such as nausea and vomiting, anxiety, and depression [28, 29]. The nursing during this period poses a huge challenge for both nursing staff and family members, and choosing the most appropriate nursing has become a top priority. Evidence-based nursing can comprehensively improve the quality of life through psychological care, gastrointestinal care, nutritional support, and cardiovascular medication care.

The quality of life assessment in this study was based on the Short-Form 36 Health Survey Scale (SF-36), which includes the assessment of physiological functions, physiological roles, physical pains, general health, vitalities and social functions, emotional functions, and mental health. It is simple and easy to use, and accurate information can be obtained in only 10 minutes, and the life quality score can be quickly obtained to guide the clinical treatment [30]. The SAS and SDS are used to evaluate a patient's mental state and emotions, so as to develop personalized psychological care, which can effectively enhance the patient's self-confidence, improve the patient's quality of life, and guide the nursing staff to care for and help patients from multiple angles, thus forming a more harmonious doctor-patient relationship and improving nursing satisfaction [31].

In this study, the incidence of adverse reactions in the observation group was significantly lower than it was in the control group, and the hospital stays were shorter than they were in the control group too (P<0.05), which indicated that after receiving evidence-based nursing, the treatment effect of the patients was significantly enhanced, the patients could actively cooperate with treatment, and the patients' confidence in the treatment was improved. One study found that the Pittsburgh sleep quality index of the study group was significantly lower than that of the control group during chemotherapy after mastectomy, and the improvement degree of the adverse moods was also higher than that of the control group [32]. The score of SF-36 for the observation group was significantly higher than that of the control group. The SAS and SDS scores were significantly lower than the control group's scores, which indicated that evidence-based nursing could reduce the degree of depression and anxiety in patients and significantly improve their physiological and psychological statuses through targeted psychological nursing intervention. Related studies found that in postoperative patients with cervical cancer, the SF-36, SAS, and SDS scores in the study group that received the targeted psychological intervention were more improved than they were in the control group, and the study group's complications were significantly less than those of the control group [33]. This study shows that evidence-based nursing has a higher nursing effect during postoperative chemotherapy for breast cancer, but the nursing effect on patients of this method has not been explored at the molecular level. In a future study, we will explore how the evidence-based nursing affects the indicators in patients at the molecular level. This study is a single-center test in which multi-center clinical trials can be performed to eliminate inter-subject differences and center-to-center differences for more reliable data. In addition, more scholarly articles related to gynecological diseases will be consulted to screen out diseases with a higher incidence. Evidence-based nursing intervention was performed in patients with higher incidence diseases to explore the nursing effect. In summary, evidence-based nursing during postoperative chemotherapy for breast cancer patients can significantly improve their quality

of life, reduce adverse reactions, and improve enthusiasm for treatment. Evidence-based nursing has a high value of nursing intervention, so it can be widely used during chemotherapy for breast cancer.

Disclosure of conflict of interest

None.

Address correspondence to: Feifei Yu, Central Ward Operating Room, Yantai Yuhuangding Hospital, No. 20, Yuhuangding East Road, Yantai 264000, China. Tel: +86-0535-6691999-81401; E-mail: beiyongyx01@163.com

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