

Impact of Empowerment Theory-Based Nursing Intervention on the Quality of Life and Negative Emotions of Patients Diagnosed with Brain Metastasis Post Breast Cancer Surgery

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Objective: This study explores the impact of a nursing intervention grounded in empowerment theory, focusing on behavioral change, on brain metastasis patients post-breast cancer surgery.

Methods: Between June 2021 and June 2023, 102 patients diagnosed with brain metastasis after breast cancer surgery at Bao Ding No.1 Central Hospital were randomized into two groups. The control group (51 patients) received standard nursing care, while the observation group (51 patients) participated in a behavioral change nursing intervention influenced by empowerment theory. The evaluation metrics included measures of negative emotions, compliance with treatment protocols, overall quality of life, and nursing satisfaction, assessed at multiple time points during the study period.

Results: The intervention led to significant reductions in negative emotions for all patients when compared to their pre-intervention statuses, with the observation group exhibiting notably lower depression and anxiety scores at one and three months post-intervention ($P < 0.05$). Additionally, this group achieved higher compliance scores and demonstrated greater improvements in quality of life than the control group ($P < 0.05$). Nursing satisfaction was also significantly higher in the observation group, with 96.08% reporting high satisfaction compared to 80.39% in the control group ($P < 0.05$).

Conclusion: Implementing a nursing intervention that emphasizes behavioral changes and leverages empowerment theory significantly enhances the quality of life, reduces negative emotions, boosts compliance with treatment, and increases nursing satisfaction among patients with brain metastasis following breast cancer surgery. This suggests that such interventions could be a valuable component of postoperative care for this patient population.

Keywords: behavioral change, empowerment theory, negative emotions, nursing intervention, brain metastasis, breast cancer, quality of life

Introduction

Breast cancer constitutes a prevalent malignancy among women, representing approximately 7%–10% of all malignant tumors and ranking second only to cervical cancer. This disease poses a substantial threat to the lives of women and overall health.^{1,2} Postoperative brain metastasis resulting from breast cancer is frequently encountered in clinical practice, emerging as the second most prevalent source of brain metastatic tumors. Its occurrence significantly impacts the overall survival (OS) and Quality of Life of patients.³ In patients diagnosed with postoperative brain metastases originating from breast cancer, researchers have identified patterns of avoidance behaviors, unclear self-concept values, and limited psychological resilience, all of which can adversely affect patient recovery and the overall Quality of Life.^{4–6} Present nursing interventions often lack specific strategies to address cognitive-behavioral changes in patients, potentially

compromising treatment and recovery results.^{7,8} Postoperative care interventions play a pivotal role in enhancing the Quality of Life and mitigating negative emotions in such patients. Behavioral change nursing interventions, grounded in empowerment theory, aim to modify the cognition and behavior of patients through health education and various other methods, thereby enhancing their self-care abilities. This approach facilitates improved management of psychological stress and emotional distress stemming from the disease, ultimately contributing to an enhancement in the overall Quality of Life.^{9,10} However, the use of these nursing interventions remains less prevalent in the care of patients with brain metastasis following breast cancer surgery. Therefore, there exists a need for further exploration and promotion of this nursing intervention to augment the recovery and overall Quality of Life of patients. In light of these considerations, empowerment theory in conjunction with a behavioral change nursing intervention for patients with postoperative brain metastasis resulting from breast cancer was adopted in this study. The objective is to compare the changes in negative emotions, Quality of Life, and other pertinent factors in two distinct groups before treatment, with the intention of providing novel insights and guidance for nursing interventions tailored to patients facing postoperative brain metastasis secondary to breast cancer.

Data and Methods

General Data

This study screened 124 patients with postoperative brain metastasis of breast cancer admitted to Bao Ding No.1 Central Hospital between June 2021 and June 2023. The patients were selected based on the following inclusion criteria: clinical diagnosis of postoperative brain metastasis of breast cancer; age 18 and above; absence of prior psychiatric disorders; ability to communicate normally with the researcher during the research process; and a literacy level of elementary school or above. Exclusion criteria encompassed the presence of varying degrees of cognitive impairment, unclear consciousness, or inability to cooperate, as well as the existence of complications significantly impacting their health. A total of 22 patients were excluded based on the exclusion criteria. Finally, the study cohort comprised of 102 patients. With the use of the random number table method, 51 cases each were allocated into two groups. The age ranged from 24 to 52 years in the observation group, with an average of 38.12 ± 6.69 years; average years of education were 11.00 ± 5.76 . A comparison of the social-demographic and clinical baseline data between the two groups indicated no significant difference ($P > 0.05$, Table 1). This study was conducted following approval from the Medical Ethics Committee of our hospital (Approval number: 20,230,073).

Research Method

In the control group, standard nursing interventions were administered, encompassing health education on breast cancer, postoperative brain metastasis, postoperative chemotherapy, and other relevant information. During the postoperative period, patients were instructed to engage in functional exercises and received guidance on postoperative chemotherapy medication, daily diet, and self-care. Additionally, psychological counseling was provided to assist patients in coping with negative emotions and the psychological stress associated with the treatment process. The entirety of this intervention persisted for a duration of 3 months.

In contrast, the observation group underwent a behavioral change nursing intervention guided by empowerment theory, implemented as follows: (1) Preparation Stage: A nursing intervention team was assembled, comprising one

Table 1 Socio-Demographic and Clinical Characteristics of the Two Groups

Group	Age (years)	Education (years)	TNM stage (cases)			Disease duration (years)	ECOG score (points)
			Stage I	Stage II	Stage III		
Observation group (n = 51)	38.12±6.69	11.00±5.76	20 (39.22)	25 (49.02)	6 (11.76)	1.32±0.56	0.73±0.45
Control group (n = 51)	38.94±6.82	10.67±6.01	21 (41.18)	23 (45.10)	7 (13.73)	1.36±0.58	0.92±0.27
t/χ^2	-0.616	0.286	0.000			-0.364	-2.661
P	0.539	0.776	1.000			0.716	0.059

experienced physician of deputy director level or higher, one nursing expert, one psychological counselor, and several responsible nurses. Nursing intervention plans were formulated and optimized by physicians to ensure their scientific, practical, and targeted nature. Supervision and evaluation of the implementation effects of nursing interventions were conducted by them, with timely adjustments to strategies made to maximize patient benefits. Nursing experts participated in the formulation of nursing intervention plans, providing professional opinions and suggestions. The effectiveness of nursing on patients was regularly assessed, with nursing plans adjusted promptly. Psychological counseling and support were provided by psychological counselors to help patients establish positive attitudes towards life and coping mechanisms. Collaboration with nursing experts was undertaken to develop integrated psychological intervention plans, enhancing patients' overall psychological status. In forming the nursing team, experienced and qualified nursing staff were assigned and underwent regular training to enhance their professional skills. Staff familiarized themselves with the clinical information and social connections of the patients, engaging in open communication with the patient and their family to understand their psychological and physiological condition. Based on this information, a personalized nursing intervention plan was developed and communicated to patients and their families before implementation. This plan guided patients in self-examination, emphasized the significance of cognitive and behavioral changes, and organized patient communication to enhance enthusiasm for behavioral changes. (2) Empowerment Phase: Nursing staff conducted empowerment education to help patients understand their negative emotions and provided emotional support. Patients were guided to express their emotions, address questions, and receive assistance in dealing with cognitive problems and ambiguous self-awareness. Communication with family members was emphasized, highlighting the importance of companionship, and increasing the frequency of communication. Patients who had recovered well were encouraged to connect with each other to build trust and confidence. Regular health education sessions were conducted to alleviate anxiety, assess understanding, and demonstrate daily self-care routines. The importance of diet, nutrition, and moderate exercise was also emphasized. (3) Behavioral Change Phase: Nursing staff assessed the overall situation of the patients through early preparation and empowerment phases, providing effective guidance by raising awareness, correcting misconceptions, and encouraging successful patients to share their experiences. This aimed to enhance patient understanding and improve compliance with the treatment plan. During this stage, nursing staff explained appropriate behavior in strict accordance with the implementation plan, continually monitoring the mood and physiological condition of the patients. Adjustments to the plan were promptly made, if necessary, based on the actual situation of the patients. (4) Maintenance Phase: Emphasis in this phase was placed on family education, encouraging family members to actively participate in the ongoing rehabilitation management of the patient. This involvement will help guide the patient in continuing to adhere to the treatment plan. Simultaneously, regular telephone follow-up visits were scheduled for supervision.

Observation Indicators

- ① Negative emotions:¹¹ Changes in the degree of depression among the patients before and after nursing interventions were assessed using the self-rating depression scale (SDS). The scale demonstrated good reliability and validity, as evidenced by an internal consistency measured by Cronbach's α coefficient > 0.8 . Similarly, changes in the anxiety levels before and after nursing interventions were assessed using the self-rating anxiety scale (SAS), which also exhibited good reliability and validity, as evidenced by an internal consistency measured by Cronbach's α coefficient > 0.8 .
- ② Compliance:¹² The assessment of the adherence of the patient to rehabilitation exercises was conducted using the postoperative rehabilitation exercise compliance scale. This scale, designed for assessment, comprises of three scores: compliance to physical exercise, compliance to postoperative precautions, and compliance to actively seeking advice. Subsequently, the scores were aggregated, and the compliance of the patients was deemed better with a higher total score.
- ③ Quality of Life:¹³ The Quality of Life of patients diagnosed with breast cancer was assessed using the functional assessment of cancer therapy-B (FACT-B). This tool encompasses evaluations of physical, social, emotional, and functional aspects, including specific components related to breast cancer concerns. Physicians can use this tool to gain insights into the physical condition of the patient, social and family support, emotional state, and ability to perform daily functional activities. This information is essential for the development of a personalized treatment plan and support measures. A better Quality of Life was indicated by higher scores on this scale.

④ Satisfaction:¹⁴ The assessment of the level of satisfaction with nursing interventions in both groups was conducted through questionnaires, categorizing the results as very satisfied, satisfied, or dissatisfied.

Statistical Analysis

SPSS 22.0 was used for statistical analysis. Count data were expressed as n (%), and between-group comparisons were conducted using the chi-square test. Continuous data were initially assessed for normality using the Shapiro–Wilk test. If the data met the criteria for normality, they were presented as (mean ± standard deviation), and between-group comparisons were conducted using independent *t*-tests, while within-group pre- and post-intervention comparisons were performed using paired *t*-tests. The interaction effect between groups and time was analyzed using repeated measures analysis of variance. The test was conducted at an alpha = 0.05 level with a two-sided approach.

Results

Comparison of SDS and SAS Scores Between the Two Groups at Various Time Points

Both groups had significantly reduced negative mood levels subsequent to the intervention compared to their pre-intervention scores. After one month of the intervention, the observation group exhibited notably diminished SDS scores (48.73±5.42 vs 53.67±5.82) and SAS scores (47.33±7.93 vs 50.51±8.03). Furthermore, following a three-month intervention, the observation group exhibited reduced SAS scores (45.55±7.38 vs 49.14±7.96) and SDS scores (45.89±4.47 vs 50.59±5.47) in comparison to the control group (*P*<0.05, Table 2, Figure 1).

Comparison of Compliance Scores Between the Two Groups

The compliance scores of both groups exhibited a substantial increase subsequent to the intervention in comparison to their pre-intervention levels. The intervention resulted in higher compliance dimension and total scores for the observation group compared to the control group (19.39±5.33 vs 14.25±4.91), (20.27±5.76 vs 15.92±5.29), (21.43±6.22 vs 18.73±5.91), and (61.10±13.17 vs 48.90±12.86) (*P* < 0.05, Table 3, Figure 2).

Comparison of the Quality of Life Between the Two Groups

The QOL scores of both groups exhibited a substantial increase subsequent to the intervention in comparison to their pre-intervention levels. The observation group achieved higher scores on the Quality of Life dimensions (16.47±4.64 vs 13.41±4.45), (17.35±5.12 vs 14.29±4.31), (15.33±4.17 vs 11.18±3.92), (17.67±5.28 vs 14.82±5.00), and (25.76±7.53 vs 21.08±7.01) subsequent to the intervention, as compared to the control group (*P* < 0.05, Table 4).

Satisfaction with Nursing Care

A difference in nursing satisfaction was seen between the two groups. In particular, the percentage of participants in the observation group (96.08%, 49/51) was considerably greater than that of the control group (80.39%, 41/51), *P* < 0.05, as revealed in Table 5 and Figure 3).

Table 2 Comparison of SDS and SAS Between the Two Groups at Various Time Points

Indicator	Group	n	Before intervention	1 month after intervention	3 months after intervention	F value	P value
SDS score	Observation group	51	57.47±6.44	48.80±5.41	46.00±4.49	<i>F</i> _{time point} = 164.874; <i>F</i> _{between groups} = 9.714; <i>F</i> _{interaction} = 17.376	<i>P</i> _{time point} <0.001; <i>P</i> _{between groups} = 0.002; <i>P</i> _{interaction} <0.001
	Control group	51	57.06±6.34	53.67±5.82	50.59±5.47		
	<i>t</i>		0.325	-4.373	-4.634		
	<i>P</i>		0.746	<0.001	<0.001		
SAS score	Observation group	51	53.25±9.08	47.35±7.93	45.63±7.41	<i>F</i> _{time point} = 29.934; <i>F</i> _{between groups} = 2.271; <i>F</i> _{interaction} = 4.223	<i>P</i> _{time point} < 0.001; <i>P</i> _{between groups} = 0.043; <i>P</i> _{interaction} = 0.018
	Control group	51	52.80±8.78	50.51±8.03	49.14±7.96		
	<i>t</i>		0.255	-1.997	-2.305		
	<i>P</i>		0.799	0.049	0.023		

Note: The F-value is the statistical value of repeated measures analysis of variance.

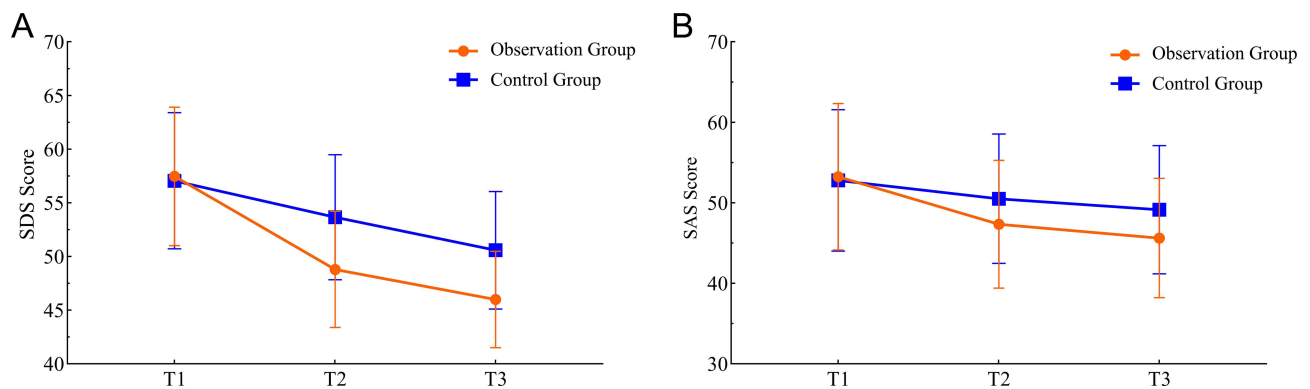


Figure 1 (A) SDS score at various time points. (B) SAS score at various time points.

Note: T1, T2, and T3 indicate pre-intervention, 1 month after intervention, and 3 months after intervention, respectively.

Discussion

Breast cancer surgery, being an invasive procedure, has the potential to elicit stress responses in patients. Furthermore, the surgery may induce changes in external appearance, intensifying negative emotions and subsequently influencing the recovery process of the patients.¹⁵ Currently, a proportion of breast cancer recurrences manifests in brain metastases, presenting symptoms such as vomiting, nausea, palpitations, dizziness, blurred self-awareness, and sudden loss of consciousness. These symptoms significantly impact the psychological and physiological well-being of patients, thereby affecting overall Quality of Life.⁴ Consequently, timely measures are imperative to enhance Quality of Life and alleviate negative emotions in patients who are affected. The existing nursing interventions for patients with postoperative brain metastases following breast cancer predominantly encompass routine care, lacking specific interventions tailored to the unique characteristics of these patients. Hence, there is a pressing need for further research and the development of targeted nursing interventions in this context.

The study results demonstrated that one month after the intervention, the SDS scores in the observation group were significantly lower than those in the control group. Furthermore, the difference between the two groups increased with the duration of the nursing intervention. Similarly, at the one-month post-intervention mark, the SAS scores in the observation group were significantly lower than those in the control group, and this disparity between the two groups increased with the ongoing duration of the nursing intervention. The nursing intervention, centered on behavioral change

Table 3 Comparison of Compliance Scores Between the Two Group ($\bar{x} \pm s$)

Indicator	Group	n	Before intervention	After intervention	Paired t	P
Physical exercise compliance	Observation group	51	11.63±3.98	19.39±5.33	-11.577	<0.001
	Control group	51	11.98±4.35	14.25±4.91	-3.369	0.001
	t		-0.427	5.061	-	-
	P		0.670	<0.001	-	-
Postoperative precaution compliance	Observation group	51	13.53±3.72	20.27±5.76	-7.865	<0.001
	Control group	51	13.73±3.81	15.92±5.29	-3.127	0.003
	t		-0.263	3.974	-	-
	P		0.793	<0.001	-	-
Proactive advice seeking compliance	Observation group	51	15.78±4.61	21.43±6.22	-6.241	<0.001
	Control group	51	15.92±4.80	18.73±5.91	-3.394	0.001
	t		-0.147	2.252	-	-
	P		0.883	0.026	-	-
Total score	Observation group	51	40.94±9.47	61.10±13.17	-14.196	<0.001
	Control group	51	41.63±9.78	48.90±12.86	-5.876	<0.001
	t		-0.360	4.731	-	-
	P		0.720	<0.001	-	-

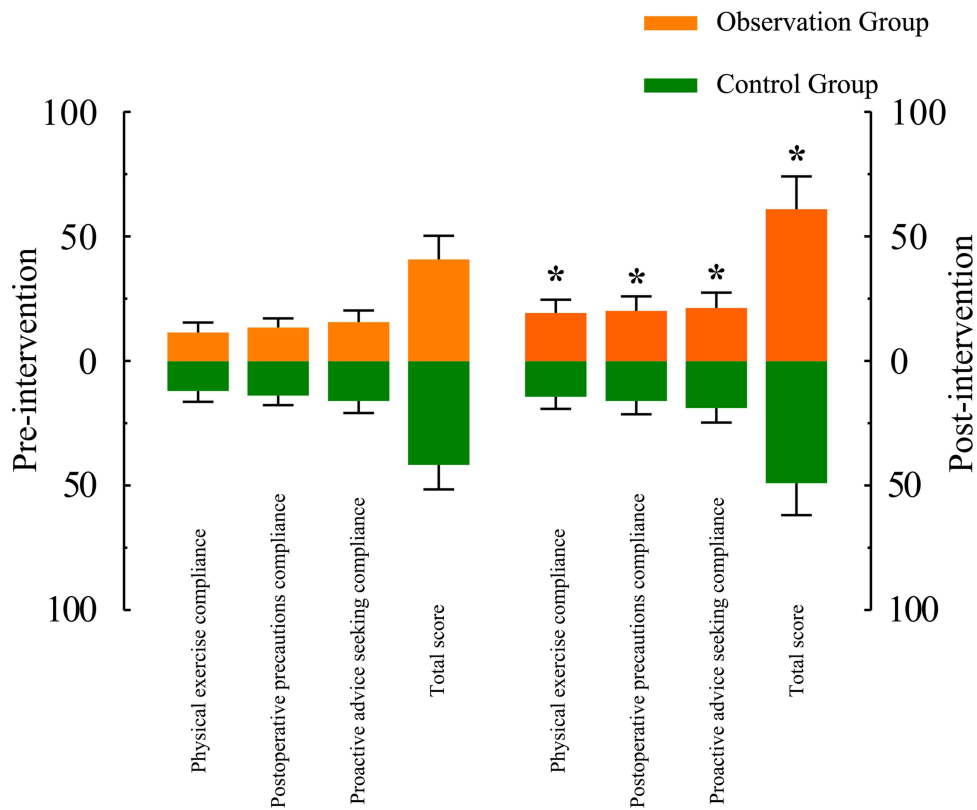


Figure 2 Comparison of compliance scores between the two groups. **Note:** * P < 0.05.

and guided by empowerment theory, exerted a noteworthy influence on improving negative emotions. The intervention was discerned as beneficial in facilitating patients to adapt their cognition and attitude towards the disease, guiding them to confront the disease positively, cultivate accurate concepts and attitudes, establish a positive mindset and goals, and

Table 4 Comparison of Quality of Life Between the Two Groups ($\bar{x} \pm s$)

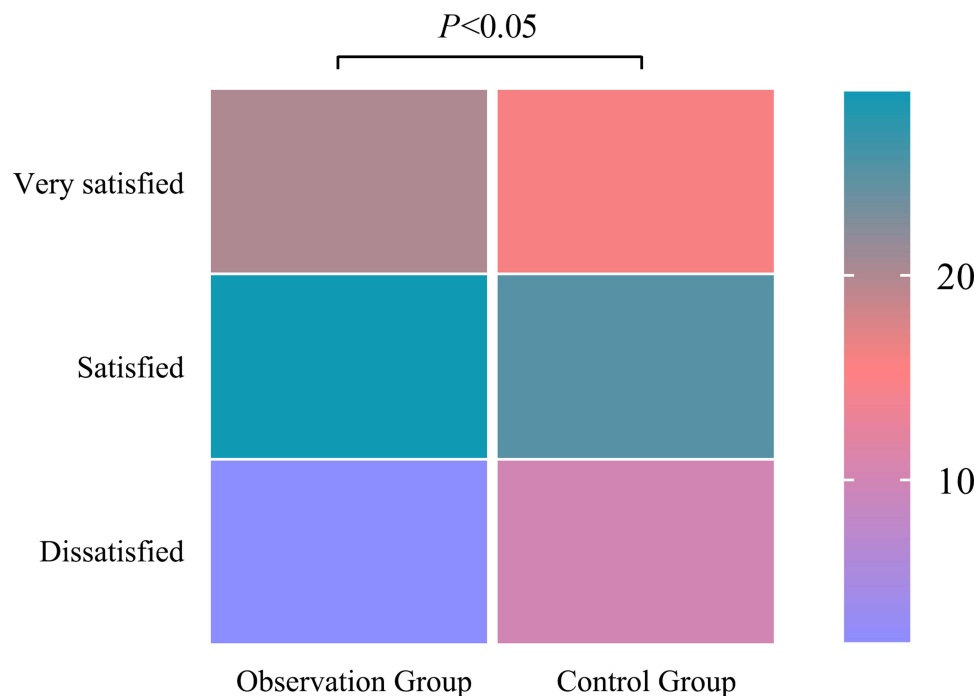
Indicator	Group	n	Before intervention	After intervention	t	P
Physical condition	Observation group	51	10.96±3.12	16.47±4.64	-8.848	<0.001
	Control group	51	10.98±3.16	13.41±4.45	-3.561	0.001
	t		-0.032	3.399	-	-
	P		0.975	0.001	-	-
Social and family status	Observation group	51	12.49±3.65	17.35±5.12	-6.951	<0.001
	Control group	51	12.76±3.85	14.29±4.31	-2.602	0.012
	t		-0.370	3.265	-	-
	P		0.712	0.001	-	-
Emotional status	Observation group	51	9.90±3.62	15.33±4.17	-8.934	<0.001
	Control group	51	9.84±3.57	11.18±3.92	-3.205	0.002
	t		0.083	5.185	-	-
	P		0.934	<0.001	-	-
Functional status	Observation group	51	11.78±3.85	17.67±5.28	-8.959	<0.001
	Control group	51	11.69±3.92	14.82±5.00	-5.234	<0.001
	t		0.127	2.794	-	-
	P		0.899	0.006	-	-
Additional concerns	Observation group	51	17.47±5.49	25.76±7.53	-7.517	<0.001
	Control group	51	17.94±5.73	21.08±7.01	-2.836	0.007
	t		-0.424	3.255	-	-
	P		0.673	0.002	-	-

Table 5 Satisfaction with Nursing Care

	Very satisfied	Satisfied	Dissatisfied	Total satisfaction (%)
Observation group (n=51)	20 (39.22)	29 (56.86)	2 (3.92)	49 (96.08)
Control group (n=51)	16 (31.37)	25 (49.02)	10 (19.61)	41 (80.39)
χ^2	–	–	–	–2.510
P-value	–	–	–	0.014

Note: χ^2 is the cross-tabulated χ^2 test statistic value for the comparison of total satisfaction between the two groups.

ultimately achieve recovery and realization of self-worth.^{16,17} This optimistic mindset and defined objectives served to stimulate intrinsic motivation, enhance psychological adaptability, and elevate the Quality of Life among patients. Regular psychological assessments are integral to comprehending the emotional states and life requirements of the patients. Based on the assessment results, nursing interventions should be promptly adjusted, accompanied by appropriate psychological support and encouragement. Establishing a good communication relationship with the patient, involving attentive listening to their feelings and understanding their conditions, is crucial. Additionally, teaching the patients emotional regulation skills and methods, aiding them in mastering self-regulation of emotions, and augmenting their emotional and self-management abilities are essential components. Regular feedback on their physiological and psychological conditions holds equal importance. Concurrently, through education and training, patients can be assisted in comprehending fundamental information concerning postoperative brain metastasis of breast cancer, treatment alternatives, and self-management skills.^{18,19} This fosters an enhanced understanding and management of the disease, thereby bolstering self-confidence and coping abilities. Elevating the confidence of the patients to the point where they actively cooperate with nursing team interventions can significantly improve negative emotions and contribute to their recovery, establishing a virtuous circle.²⁰ In the present study, enhanced compliance scores were noted in both groups when compared to the pre-intervention period. Notably, the observation group exhibited significantly higher compliance, as reflected in its total score, in comparison to the control group following the intervention. Additionally, the observation group outperformed the control group across all dimensions of FACT-B following the nursing intervention. The analysis indicates that the application of empowerment theory in conjunction with behavioral change nursing intervention

**Figure 3** Comparison of nursing satisfaction between the two groups.

promotes communication between successfully recovered patients and those currently undergoing nursing intervention, fostering patient confidence in the intervention approach. This heightened confidence is expected to result in increased willingness to cooperate with the nursing team, consequently leading to a substantial improvement in the adherence of patients.^{21,22} Empowerment theory underscores patient initiative and a sense of control. Through behavioral change nursing interventions, patients are encouraged to assume control of their health status and actively participate in decision-making. This newfound sense of control and self-confidence can enhance the psychological adaptability and coping ability of the patient, ultimately reducing negative emotions.^{23,24} Nursing interventions for behavioral change, guided by empowerment theory, aim to cultivate the personal initiative of the patients, enhancing their ability to self-manage. By motivating patients to adopt health-promoting behaviors, such as maintaining a healthy diet, engaging in moderate exercise, and adhering to good sleep habits, these positive behaviors contribute to improving both physical and psychological well-being, thereby mitigating the impact of negative emotions.^{25,26} Family members were encouraged to closely attend to the social support and emotional well-being of the patients. This approach strengthened the bond between patients and their families and friends, contributing to enhanced social and family standing, as well as emotional and physical well-being. Additionally, it led to improved physical and psychological care, alongside corresponding nursing interventions, ultimately enhancing the overall Quality of Life for the patients. Following the nursing intervention, the satisfaction rate among patients in the observation group was 96.08% (49/51), significantly surpassing that of the control group, which stood at 80.39% (41/51). This difference indicates the favorable reception of the nursing intervention by the majority of patients.

In conclusion, patients with brain metastases after breast cancer surgery often face tremendous psychological pressure, including fear, anxiety, depression, and other negative emotions. Nursing emphasizes emotional care, helping patients adjust their mindset and enhance their confidence through psychological counseling, emotional therapy, and other means, thereby alleviating the negative impact of negative emotions on patients' physical and mental health. Additionally, through health education, dietary guidance, exercise rehabilitation, and other methods, nursing can enhance patients' understanding of the disease and treatment plans, improve their self-management abilities, and help patients better comply with treatment, thereby improving treatment outcomes and reducing the incidence of complications. Because nursing emphasizes personalized, humanized service concepts and focuses on communication and interaction with patients, it can better meet patients' needs and enhance patient satisfaction. This not only helps improve doctor-patient relationships but also increases patients' trust and dependence on medical services. Our study showed that the implementation of a behavioral change nursing intervention guided by empowerment theory emerged as a substantial contributor to enhancing the Quality of Life, diminishing negative emotions, improving compliance, and elevating nursing satisfaction among patients with postoperative brain metastasis of breast cancer. However, it is essential to acknowledge certain limitations within the study, including a relatively small sample size and a brief intervention duration, potentially impacting the stability and reliability of the results. Future research endeavors should strive to address these limitations by expanding the sample size, extending the intervention and follow-up periods, and exploring additional interventions and methodologies. This would serve to further validate the effectiveness and feasibility of the empowerment theory-guided behavioral change nursing intervention in patients with brain metastases following breast cancer surgery.

Abbreviation

TNM, tumor node metastasis; ECOG, Eastern Cooperative Oncology Group; SDS, Self-rating Depression Scale; SAS, Self-Rating Anxiety Scale; FACT-B, the functional assessment of cancer therapy-B.

Data Sharing Statement

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

This study was conducted with approval from the Ethics Committee of Shijiazhuang Fourth Hospital (No.20230073). This study was conducted in accordance with the declaration of Helsinki. Written informed consent was obtained from all participants.

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Disclosure

The authors declare that they have no competing interests in this work.

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